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Page 1 of 2	Proj. ECN

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ENGINEERING CHANGE NOTICE

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19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
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Design Authority			Design Agent		
Cog. Eng.	J.M. Conner *JM Conner*	1-30-97	PE		
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QA			Safety		
Safety			Design		
Environ.			Environ.		
Other	R.J Cash *RJ Cash*	1/31/97	Other		
	N.W. Kirch *NWKirch*	1/30/97			

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

Tank Characterization Report for Single-Shell Tank 241-B-201

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U.S. Department of Energy Contract DE-AC06-87RL10930

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Abstract: This document summarizes the information on the historical uses, present status, and the sampling and analysis results of waste stored in Tank 241-B-201. This report supports the requirements of the Tri-Party Agreement Milestone M-44-05.

Kara M Broz 2/3/97

Release Approval Date

DATE FEB 03 1997 STA. 4

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RECORD OF REVISION	(1) Document Number HNF-SD-WM-ER-550	Page 1

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Tank Characterization Report for Single-Shell Tank 241-B-201

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LIST OF TERMS

AEA	alpha energy analysis
ANOVA	analysis of variance
Btu/hr	British thermal units/hour
cal/g	calories per gram
CF	concentration factor
ci	curies
ci/h	curies per hour
cm	centimeter
cP	centipoise
CVAA	cold vapor atomic abosorption
°C	Celsius
DSC	differential scanning calorimetry
DQO	data quality objective
dynes/cm^2	dynes per square centimeter
°F	Fahrenheit
ft	feet
ft/sec	feet per second
g/L	grams per liter
g/mL	grams per milliliter
gal	gallon
gal/min	gallon per minute
GC/MS	gas chromatography/mass spectrometry
GEA	gamma energy analysis
GFAA	graphite furnace atomic absorption
HDW	Hanford defined waste
HTCE	historical tank content estimate
IC	ion chromatography
ICP	inductively coupled plasma
in.	inch
ISE	ion selective electrode
J/g	joules per gram
kg	kilograms
kgal	kilogallon
kL	kiloliter
L	liter
LANL	Los Alamos National Laboratory
m	meter
mg/L	milligrams per liter
mm	millimeters
n/a	not applicable
Pa sec	pascals per second
PHMC	Project Hanford Management Contractor

LIST OF TERMS (Continued)

ppm	parts per million
QC	quality control
RPD	relative percent difference
RSD	relative standard deviation
SAL	Shielded Analytical Laboratory
SMM	Supernatant Mixing Model
SVOA	semi-volatile organics analysis
TC	total carbon
TCLP	toxicity characteristic leaching procedure
TCR	tank characterization report
TIC	total inorganic
TGA	thermogravimetric analyses
TLM	Tank Layer Model
TOC	total organic carbon
TWRS	Tank Waste Remediation System
VOA	volatile organic analysis
W	watts
WSTRS	Waste Status and Transaction Record Summary
μCi/g	microcuries per gram
μeq/g	microequivalent per gram
μg/g	micrograms per gram
μm	micrometer

1.0 INTRODUCTION

One major function of the Tank Waste Remediation System (TWRS) is to characterize wastes in support of waste management and disposal activities at the Hanford Site. Analytical data from sampling and analysis, along with other available information about a tank, are compiled and maintained in a tank characterization report (TCR). This report and its appendices serve as the TCR for single-shell tank 241-B-201.

The objectives of this report are: 1) to use characterization data in response to technical issues associated with tank 241-B-201 waste, and 2) to provide a standard characterization of this waste in terms of a best-basis inventory estimate. Section 2.0 summarizes the response to technical issues, Section 3.0 provides the best-basis inventory estimate, and Section 4.0 provides recommendations about safety status and additional sampling needs. Supporting data and information are in the appendices. This report also supports the requirements of the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1996), Milestone M-44-05.

1.1 SCOPE

The characterization information in this report originated from sample analyses and historical data. The most recent sampling of tank 241-B-201 (July 1991) predated the existence of data quality objectives (DQOs). An assessment of the technical issues from the currently applicable DQOs was made using data from the 1991 sampling event. Historical information for tank 241-B-201 included surveillance information, records pertaining to waste transfers and tank operations, and expected tank contents derived from a process knowledge model (see Appendix A).

Table 1-1 describes the 1991 core sampling event. Appendix B contains further sampling and analysis data from this event and data from earlier sampling events. The sampling and analysis of the 1991 core samples were performed in accordance with Winters et al. (1990), and the results were originally reported in Pool (1994). Appendix C provides information on the statistical analysis and numerical manipulation of data used in issue resolution. Appendix D contains the evaluation to establish the best basis for the inventory estimate and the statistical analysis performed for this evaluation. Appendix E is the bibliography that resulted from an in-depth literature search of all known information sources applicable to tank 241-B-201 and its respective waste type.

Table 1-1. Summary of Recent Sampling Events.

Sample/Date[1]	Phase	Location	Segmentation	Percent Recovery	Mass[2]
Core 26 (7/23/91 to 7/24/91)	Solid	Riser 2	8 segments	All segments were 100% except for segment 1 (65%)[3] and segment 2 (95%)	155 to 254 g per segment
	Liquid		Recovered only in segment 1	n/a	55.7 g (57 mL)
Core 27 (7/30/91 to 8/3/91)	Solid	Riser 7	8 segments	All segments were 100%	225 to 241 g per segment
Vapor flammability (6/4/96)	Gas	Riser 2	n/a	n/a	n/a

Notes:

n/a = not applicable

[1]Dates are in the mm/dd/yy format.
[2]Mass per segment
[3]Only a 70% recovery was expected from segment 1.

1.2 TANK BACKGROUND

Tank 241-B-201 is located in the 200 East Area B Tank Farm on the Hanford Site. Tank 241-B-201 is not connected to another tank (although tanks 241-B-202, 241-B-203, and 241-B-204 are connected by tie lines). The process history of this tank is relatively straightforward compared to many other tanks. For its entire service lifetime, beginning in 1952 and ending in 1975, the tank was used to store wastes from the B Plant 224 facility. This building housed a lanthanum fluoride-based separation process (one of the final steps in the bismuth phosphate process) that discharged wastes containing low concentrations of fission products. Waste from this facility was pumped into tank 241-B-201, the solids settled, and the liquid effluent overflowed into cribs (long trenches engineered to receive waste material disposed into the soil). In 1980, surveillance data indicated the tank leaked 4,500 L (1,190 gal) of waste. Consequently, interim stabilization and intrusion prevention activities were performed for the tank in 1981.

Table 1-2 describes tank 241-B-201. The tank has an operating capacity of 208 kL (55 kgal) and presently contains an estimated 110 kL (29 kgal) of noncomplexed waste (Hanlon 1996). Of this total amount, 106 kL (28 kgal) is estimated to be sludge and the remaining 4 kL (1 kgal) to be supernate. The tank is not on the Watch List (Public Law 101-510 1990).

Table 1-2. Description and Status of Tank 241-B-201.

TANK DESCRIPTION	
Type	Single-shell
Constructed	1943 to 1944
In service	1952
Diameter	6.1 m (20 ft)
Depth	7.8 m (25.5 ft)
Capacity	210 kL (55 kgal)
Bottom shape	Dished
Ventilation	Passive
TANK STATUS	
Waste classification	Noncomplexed
Total waste volume	110 kL (29 kgal)
Supernate volume	4 kL (1 kgal)
Sludge volume	106 kL (28 kgal)
Waste surface level (October 21, 1996)	386 cm (152 in.)
Temperature (1975 to 1996)	10.2 °C (50.3 °F) to 26.7 °C (80.0 °F)
Integrity	Assumed leaker
Watch List	None
SAMPLING DATES	
Core samples	July/August 1991
Flammability screening	June 1996
SERVICE STATUS	
Removed from service	1975
Interim stabilization	1981
Intrusion prevention	1981

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2.0 RESPONSE TO TECHNICAL ISSUES

Two technical issues from the *Tank Waste Characterization Basis* (Brown et al. 1996) have been identified for tank 241-B-201. They are:

- Safety screening: Does the waste pose or contribute to any recognized potential safety problems?
- Vapor screening: Does an organic solvent pool exist in the tank?

Data from two core samples taken in 1991 and flammability screening of the headspace in 1996 provide the means to address the safety screening issue. The response is detailed in Section 2.1. For sample and analysis data for tank 241-B-201, see Appendix B. The vapor screening issue cannot be addressed at this time because vapor sampling has not been conducted.

Section 2.2 provides information about other technical issues (analytical data quality and heat generation in the waste).

2.1 SAFETY SCREENING

The data required to screen the waste in tank 241-B-201 for potential safety problems is documented in the *Tank Safety Screening Data Quality Objective* (Dukelow et al. 1995). The potential safety problems are exothermic conditions in the waste, flammable gases in the waste and/or tank headspace, and criticality conditions in the waste. Each condition is addressed separately below. Because tank 241-B-201 is not a Watch List tank, the safety screening DQO was the only safety-related DQO associated with the sampling effort.

Although core sampling of tank 241-B-201 preceded the implementation of the DQO process for addressing tank waste issues, the core sampling was consistent with the guidance of the DQO (two full length cores from widely spaced risers). However, analysis of the core samples was conducted differently from the guidance of the current DQO. Nevertheless, the data collected can be used to address the safety screening issues.

2.1.1 Exothermic Conditions (Energetics)

The first requirement outlined in the safety screening DQO was to ensure that the exothermic constituents (organic or ferrocyanide) in the tank would not cause a safety hazard. The safety screening DQO requires that the waste profile be tested for energetics every half-segment (24 cm [9.5 in.]) to determine whether the energetic potential of the waste exceeds the safety threshold limit. The threshold limit for energetics is 480 J/g on a dry weight basis. Results were obtained on two core composite samples for core 26 and on each of eight segments (48 cm [19 in.]) of core 27 using differential scanning calorimetry (DSC). No exotherm was apparent for any sample.

In addition, the concentration of total organic carbon (TOC) in the composite samples of each core was less than 0.5 weight percent. The action limit in the DQO is three percent. This indicates the samples do not contain sufficient organic material to warrant further analysis.

Although the subsampling scheme was not the same as currently prescribed, the low organic content and complete lack of energetic potential in any sample analyzed provides reassurance that no exothermic reaction will occur in this tank.

2.1.2 Flammable Gas

Combustible gas monitoring of the tank headspace on June 4, 1996, indicated that no flammable gas was detected (zero percent of the lower flammability limit). Appendix B provides data from this vapor phase measurement. These data satisfy the requirement of the safety screening DQO for addressing tank vapor flammability concerns.

2.1.3 Criticality

The safety threshold is 1 g ^{239}Pu per liter of waste. Using a conservative density value of 1.5 g/mL (the average calculated from extrusion data was 1.25 g/mL), 1 g/L of ^{239}Pu is equivalent to 41 μCi/g. According to the safety screening DQO, each sample must be under the limit when compared at a 95 percent upper confidence interval on the mean. The DQO also requires measurements on lower half segments of each segment.

Again, the subsampling and analysis scheme was different from that currently prescribed in the safety screening DQO. Two core composites from each core were analyzed for total alpha and Pu. All results were well below the limit of 41 μCi/g. The highest upper limit to a 95 percent confidence interval on a core composite sample was 1.92 μCi/g (see Table 2-1).

Two issues must be addressed. The first is that only core composite samples were analyzed for alpha although the DQO requires assays from lower half-segments. Although the cores appeared homogeneous throughout, is possible that a heavy element like plutonium could migrate to the tank bottom[1]. If it is assumed that plutonium migrated to the bottom of the tank, then all activity in the composite sample could be found in the lower half-segment of

[1]The data for tanks 241-B-203 and 241-B-204 indicate that lead may have settled to the tank bottom (Jo et al. 1996 and Sasaki et al. 1996). These data also can be explained by process variability. The total alpha results for these tanks along with data for other heavy elements like bismuth and uranium show no evidence of settling.

Table 2-1. Total Alpha and Plutonium Data for Tank 241-B-201[1,2,3].

Sample		Mean (µCi/g)	95% Upper Confidence Limit (µCi/g)
Core 26 Composite I	Total alpha	1.10	1.63
	Alpha: $^{239/240}Pu$	0.802	1.03
Core 26 Composite II	Total alpha	1.05	1.45
	Alpha: $^{239/240}Pu$	0.786	1.54
Core 27 Composite I	Total alpha	1.55	1.70
	Alpha: Pu	1.48	1.98
Core 27 Composite II	Total alpha	1.56	1.71
	Alpha: Pu	1.47	1.66

Notes:

[1] Pool (1994)

[2] Pu determined by separation and alpha counting. $^{239/240}Pu$ constitutes greater than 99% of total Pu by alpha energy analysis (AEA).

[3] Data were rejected as quality control standards and spikes were not reported.

segment 8. Because that portion of the core would make up 1/16 of the core composite, the concentration in that segment would be 16 times the concentration in the composite, or 30.7 µCi/g. Because this is still below the action limit of 41 µCi/g, it can be concluded that using composite level results is acceptable.

The second issue is that when these data were validated, the total alpha and $^{239/240}Pu$ data were rejected (Pool 1994) because the quality control standards and spikes required by the sampling and analysis plan (Winters et al. 1990) were not reported. Although the data were rejected, the following evidence suggests that the data are reasonable.

The B Plant 224 facility waste stream is fairly distinct. Very few transfers were made into the 224 waste tanks (B-200 and T-200 series). Table 2-2 shows data on other tanks containing 224 wastes (tank 241-T-111 contains both 224 waste and first cycle waste). Although the results from tank 241-B-201 are higher results for the other tanks, the difference is not great; all results are far below the limit. In addition, the plutonium concentration predicted by the Tank Layer Model in the *Historical Tank Content Estimate for the Northeast Quadrant of the Hanford 200 East Area* (Brevick et al. 1996) is also shown in the table. It is evident that no criticality concerns are expected, and none were observed for tanks containing this waste type.

Table 2-2. Total Alpha Data on B Plant 224 Facility Wastes.

Source of measurement or estimate		Total alpha or Pu (μCi/g)	Comments
Tank	241-B-201[1]	1.32	Total alpha mean
		1.92	Highest 95% confidence limit
	241-B-202[2]	0.406	Total alpha mean
	241-B-203[3]	0.214	Total alpha mean
	241-B-204[4]	0.264	Total alpha mean
	241-T-111[5]	0.669	Highest value
Historical Tank Content Estimate for tank 241-B-201[6]		0.00977	Estimate for Pu

Notes:
[1]Data was rejected because no standards or spikes were reported (Pool 1994).
[2]Dougherty and Tran (1995)
[3]Jo et al. (1996)
[4]Sasaki et al. (1996)
[5]Simpson (1994)
[6]Brevick et al. (1996)

It should also be noted that radionuclide data for the core samples from tank 241-B-201 are consistent. The Pu data accounts for most of the total alpha activity of the samples (see Table 2-1). However, this is not conclusive proof that the data are accurate because both values are generated by alpha counting (the $^{239/240}$Pu was determined after chemical separation and partitioned based on AEA). Table 2-3 shows ^{241}Am data, generated by alpha counting and gamma energy analysis. These data for all samples are in good agreement, suggesting that both methods are probably accurate.

Together, the sample results far below the limit, consistent results even with differing analytical methods, and low concentrations predicted and observed in other tanks of this waste type indicate that there are no criticality concerns with this tank.

Table 2-3. ^{241}Am Data: Alpha Analysis vs. Gamma Energy Analysis[1,2,3].

Sample	Alpha Analysis (Mean, μCi/g)	Gamma Energy Analysis (Mean, μCi/g)
Core 26 Composite I	0.0299	0.0342
Core 26 Composite II	0.0288	0.0283
Core 27 Composite I	0.0298	0.0320
Core 27 Composite II	0.0264	0.0297

Notes:

[1]Pool (1994)

[2]For alpha, Am/Cm were separated prior to counting. The ^{241}Am ratio was determined by AEA.

[3]Data were rejected because quality control standards and spikes were not reported.

2.2 OTHER TECHNICAL ISSUES

2.2.1 Analytical Data Quality

Upon completion of the analytical work by Pacific Northwest Laboratory, the data package was validated based on the requirements of the *Waste Characterization Plan for Hanford Site Single-Shell Tanks* (Winters et al. 1990) and *Sample Management and Administration* (WHC-CM-5-3). Data quality issues were not confined to the radionuclide data discussed in Section 2.1.3. Much of the data was rejected or considered as approximate because of quality control issues such as violation of holding time requirements or quality control data not being reported (for example, spikes and laboratory control standards). The results of data validation are summarized in Appendix B. The data validation section (Section B3.3.4) of Appendix B should be consulted before using the data reported in this document because there are validation issues with much of the data.

2.2.2 Heat Generation

A factor in assessing tank safety is the heat generation and temperature of the waste. Heat is generated in the tanks from radioactive decay. An estimate of the tank heat load can be generated based on results from the 1991 sample event. Table 2-4 shows the calculated heat load.

Table 2-4. Heat Load for Tank 241-B-201 Based on Radionuclide Content.

Radionuclide[1]	Curies	Watts/Curie[2]	Watts
^{137}Cs	110	0.00472	0.5
^{90}Sr	287	0.00670	1.9
$^{239/240}Pu$ (^{239}Pu assumed)	155	0.0302	4.7
Total			7.1

Notes:

[1]Only radionuclides present above 10 curies are included.

[2]Includes daughter radionuclides.

Another estimate, based on tank headspace temperature was 54.2 W (185 Btu/hr) (Kummerer 1995). Both estimates are extremely low and are well below the limit of 11,700 W (40,000 Btu/hr) that separates high and low heat-load tanks. There is no heat-load issue with this tank.

2.2.3 Sludge Washing and Leaching Behavior

Subsamples of the core samples were subjected to washing and leaching steps to evaluate the behavior of the sludge under projected retrieval and pretreatment conditions (Lumetta and Rapko 1994). The data, along with water solubility data presented in the data package (Pool 1994), are summarized by Colton (1996). These data are used to estimate how the waste will partition into low-level and high-level waste fractions.

2.3 SUMMARY

The results from all analyses performed, when applied to resolve safety issues, show that no safety decision threshold limits are exceeded. Although the sampling and analysis were not conducted as prescribed in the current DQO (Dukelow et al. 1995), and quality control issues did exist with the data, the data are sufficient to declare the tank safe. The safety screening evaluation results are presented in Table 2.5.

Table 2-5. Summary of Safety Screening Evaluation Results.

Safety screening sub-issue	Result
Energetics	No exotherms were observed in any sample.
Flammability	0% of Lower Flammability Limit
Criticality	All analyses were well below 41 μCi/g total alpha (within 95% confidence limit on each sample). Quality control issues with the data are balanced by the consistency of results between differing analytical techniques, historical estimates, and data from tanks with the same predicted waste type (B Plant 224 facility waste).

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3.0 BEST-BASIS INVENTORY ESTIMATE

Information about the chemical and/or physical properties of tank wastes is used to perform safety analyses, engineering evaluations, and risk assessments associated with waste management activities; and to address regulatory issues. Waste management activities include overseeing tank farm operations and identifying, monitoring, and resolving safety issues associated with these operations and with the tank wastes. Disposal activities involve designing equipment, processes, and facilities for retrieving wastes and processing the wastes into a form that is suitable for long-term storage. Chemical inventory information generally is derived using two approaches: 1) inventories are estimated using the results of sample analyses; and 2) inventories are predicted using a model based on process knowledge and historical information. The most recent model was developed by Los Alamos National Laboratory (LANL) (Agnew et al. 1996). Information derived from these two approaches is often inconsistent.

An effort is underway to provide waste inventory estimates that will serve as standard characterization information for the various waste management activities (Kupfer et al. 1995). As part of this effort, an evaluation of available chemical information for tank 241-B-201 was performed that included the following:

- Data from analyses of two core samples collected in July 1991 (Pool 1994).
- The solids composite inventory estimate for this tank generated from LANL's Hanford Defined Waste (HDW) model (Agnew et al. 1996), also referred to as the historical tank content estimate (HTCE).
- An engineering assessment (see Appendix D) based on sampling data from the flowsheets for the waste process that generated the waste type present in tank 241-B-201 (B Plant 224 facility waste).

The engineering assessment has been compared to analytical data and the HDW model. These calculations are generally consistent with the analytical data and, in some cases, are consistent with the HDW model. Those analytes that remain in solution have better agreement between all three comparisons than with other analytes. With the current resources, the best source of inventory data appears to be the analytical data from the 1991 core sampling. The best-basis inventory, presented in Tables 3-1 and 3-2, is based entirely upon the 1991 core sample data. One analyte for which the analytical data may not be the best source is fluoride. Only the water soluble forms of fluoride are reported in the analytical data. At present, a debate exists as to whether insoluble fluoride is present in significant quantities in these tanks. The HDW model predicts more fluoride. Both the analytical data and the HDW model values must be carefully considered for fluoride at the present time.

Table 3-1. Sampling-Based Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-B-201. (2 sheets)

Analyte	Mean Concentration ($\mu g/g$)	Total Inventory[1] (kg)	Basis (S, M, or E)[2]	Comment
Al	3440	472	S	
Bi	94,500	13,000	S	
Ca	12,200	1,670	S	
Cl	1,650	226	S	
CO_3	nr	nr	S	
Cr	3,340	458	S	
F	5,830	800[3]	S	Water soluble only
Fe	13,400	1,840	S	
Hg	0.599	0.08	S	
K	5,810	797	S	
La	15,100	2,070	S	
Mn	19,200	2,630	S	
Na	38,200	5,240	S	
Ni	479	65.7	S	
NO_2	881	121	S	
NO_3	49,300	6,770	S	
OH	nr	nr	S	
Pb	1,360	187	S	
P as PO_4	16,700	2,300	S	
Si	20,200	2,770	S	
S as SO_4	348	47.8	S	
Sr	923	127	S	

Table 3-1. Sampling-Based Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-B-201. (2 sheets)

Analyte	Mean Concentration ($\mu g/g$)	Total Inventory[1] (kg)	Basis (S, M, or E)[2]	Comment
TOC	2360	324	S	
U_{total}	156	21.4	S	
Zr	10.7	1.47	S	

Notes:

[1]See Appendix B

[2]S = Sample-based, M = Hanford Defined Waste model based, E = Engineering assessment based (see Appendix D)

[3]Fluoride is based on water soluble portion only.

Table 3-2. Sample-Based Best-Basis Inventory Estimates for Radioactive Components in Tank 241-B-201.

Analyte	Mean Concentration ($\mu Ci/g$)	Total Inventory[1] (Ci)	Basis (S, M, or E)[2]
^{14}C	0.000316	0.043	S
^{90}Sr	2.09	287	S
^{99}Tc	0.00194	0.26	S
^{137}Cs	0.8	110	S
^{154}Eu	0.00438	0.6	S
^{237}Np	<1.24E-04	nr	S
$^{239/240}Pu$	1.13	155	S
^{241}Am	0.031	4.25	S

Notes:

nr = not reported

[1]See Appendix B

[2]S = Sample-based, M = Hanford Defined Waste model based, E = Engineering assessment based

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4.0 RECOMMENDATIONS

Core sampling of tank 241-B-201 occurred before the implementation of the DQO process for TWRS characterization. Nevertheless, the data collected may be evaluated against the requirements of the current DQOs. The current DQOs applicable to the tank are the safety screening (Dukelow et al. 1995) and vapor (Osborne and Buckley 1995) DQOs. Based on the data collected from core sampling and flammability screening of the tank headspace, the tank may be considered safe with respect to the safety screening DQO. Vapor sampling and analysis to address the vapor DQO issues has not been conducted.

Table 4-1 summarizes the status of the Project Hanford Management Contract (PHMC) TWRS Program Office review and acceptance of the sampling and analysis results. All DQO issues required to be addressed by sampling and analysis are listed in column one of Table 4-1. The second column indicates whether the requirements of the DQO were met by the sampling and analysis activities with a "yes" or "no." The third column indicates concurrence and acceptance by the program in TWRS that is responsible for the DQO that the sampling and analysis activities performed adequately met the needs of the DQO. A "yes" or "no" in column three indicates acceptance or disapproval of the sampling and analysis information presented in the TCR.

Table 4-1. Acceptance of Tank 241-B-201 Sampling and Analysis.

Issue	Sampling and Analysis Performed	TWRS[1] Program Acceptance
Safety Screening DQO	Yes	Yes
Vapor DQO	No (not sampled)	Not applicable

Note:
[1]PHMC TWRS program office

Table 4-2 summarizes the status of TWRS Program review and acceptance of the safety evaluation (whether the tank is safe, conditionally safe, or unsafe with respect to the safety screening DQO). Column one lists the different evaluations in this report. Columns two and three are the same format as Table 4-1. The manner in which concurrence and acceptance are summarized is also the same as that in Table 4-1.

Table 4-2. Acceptance of Evaluation of Characterization Data and Information for Tank 241-B-201.

Issue	Evaluation performed	TWRS[1] Program acceptance
Safety categorization	Yes	Yes

Note:
[1]PHMC TWRS program office

No further condensed phase sampling is required. Vapor sampling and analysis, as prescribed by Cash (1996), is still required.

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APPENDIX A

HISTORICAL TANK INFORMATION

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APPENDIX A

HISTORICAL TANK INFORMATION

Appendix A describes tank 241-B-201 based on historical information. For this report, historical information includes any information about the fill history, waste types, surveillance, or modeling data about the tank.

Appendix A contains the following information:

- **Section A1**: Current tank status, including the current waste levels and the tank stabilization and isolation status.
- **Section A2**: Information about the tank design.
- **Section A3**: Process knowledge about the tank, that is, the waste transfer history and estimated tank contents based on modeling data.
- **Section A4**: Surveillance data for tank 241-B-201, including surface-level readings, temperatures, and a description of the waste surface based on photographs.
- **Section A5**: References for Appendix A.

Historical sampling results (results from samples obtained prior to 1989) are included in Appendix B.

A1.0 CURRENT TANK STATUS

As of September 30, 1996, tank 241-B-201 contained an estimated 110 kL (29 kgal) of noncomplexed waste (Hanlon 1996). The waste volumes were estimated using a manual tape surface level gauge. The volumes of the waste phases found in the tank are shown in Table A1-1.

Tank 241-B-201 was removed from service in 1975. The tank was declared an assumed leaker in 1980 and is estimated to have leaked approximately 4.5 kL (1.2 kgal) of waste. The tank was interim stabilized in 1981; intrusion prevention was also completed in 1981. This passively ventilated tank is not on the Watch List (Public Law 101-510). All monitoring systems were in compliance with documented standards as of September 30, 1996 (Hanlon 1996).

Table A1-1. Tank Contents Status Summary.[1]

Waste Type	Estimated Volume	
	kL	kgal
Total waste	110	29
Supernatant liquid	4	1
Sludge	106	28
Saltcake	0	0
Drainable interstitial liquid	11	3
Drainable liquid remaining	15	4
Pumpable liquid remaining	0	0

Note:
[1]For definitions and calculation methods refer to Appendix C of Hanlon (1996).

A2.0 TANK DESIGN AND BACKGROUND

The B Tank Farm is located in the 200 East Area and was constructed during 1943 and 1944. The B Tank Farm is one of the original four tank farms (B, C, T, and U). It contains 16 waste tanks. Each of four tanks (241-B-201 to 241-B-204) have a nominal capacity of 210 kL (55 kgal). Tanks 241-B-202, 241-B-203, and 241-B-204 are connected together by tie lines; tank 241-B-201 is not. Each of the remaining 12 tanks (241-B-101 to 241-B-112) have a capacity of 2,010 kL (530 kgal).

Tank 241-B-201 is constructed of a 30-cm (1-ft)-thick reinforced concrete shell with a 0.64 cm (0.25 in.) mild carbon steel liner on the interior bottom and sides and a 30-cm (12-in.)-thick domed concrete top (Brevick et al. 1996). The tank was designed to hold nonboiling waste at a maximum fluid temperature of 104 °C (220 °F) (Leach and Stahl 1993). The tank has a diameter of 6.1 m (20 ft), a depth of 7.8 m (25.5 ft), and a dished bottom with a 1.2-m (4-ft)-radius knuckle. For shielding, the tank is buried under approximately 4 m (13 ft) of earth. The dome of tank 241-B-201 is penetrated by eight risers varying in diameter from 10 cm (4 in.) to 107 cm (42 in.) and one manhold unit that is below grade level. Table A2-1 lists the tank risers and their general use. Figure A2-1 shows a plan view of the riser configuration. Figure A2-2 is a tank cross-section summarizing the basic design of tank 241-B-201.

Table A2-1. Tank 241-B-201 Risers and Inlets.[1]

Riser Number	Diameter cm	Diameter in.	Available for Sampling[2]	Description and Comments
1	10	4		Thermocouple
2	30	12	X	Flange/B-222 observation port
3	30	12		Spare (weather covered)
4	10	4		Pit drain (weather covered)
5	10	4	X	Spare (flange, obstructed)
6	30	12	X	Breather filter
7	30	12	X	Flange
8	10	4		Liquid level reel
9	107	42		Manhole (below grade)
N1 (inlet)	7.6	3		Line V-290 (blanked in diversion box 241-B-252)
N2 (inlet)	7.6	3		Line V-291 (blanked in diversion box 241-B-252)
N3 (inlet)	7.6	3		Capped
N4 (inlet)	7.6	3		Line to sump 216-B (blanked in caisson)

Notes:

[1]From Alstad (1993), Lipnicki (1996), Tran (1993), and Vitro Engineering Corporation (1986). If there was a discrepancy between the document and the drawing, the drawing took precedence.

[2]Denotes risers identified as available for sampling (Lipnicki 1996).

Figure A2-1. Riser Configuration for Tank 241-B-201.

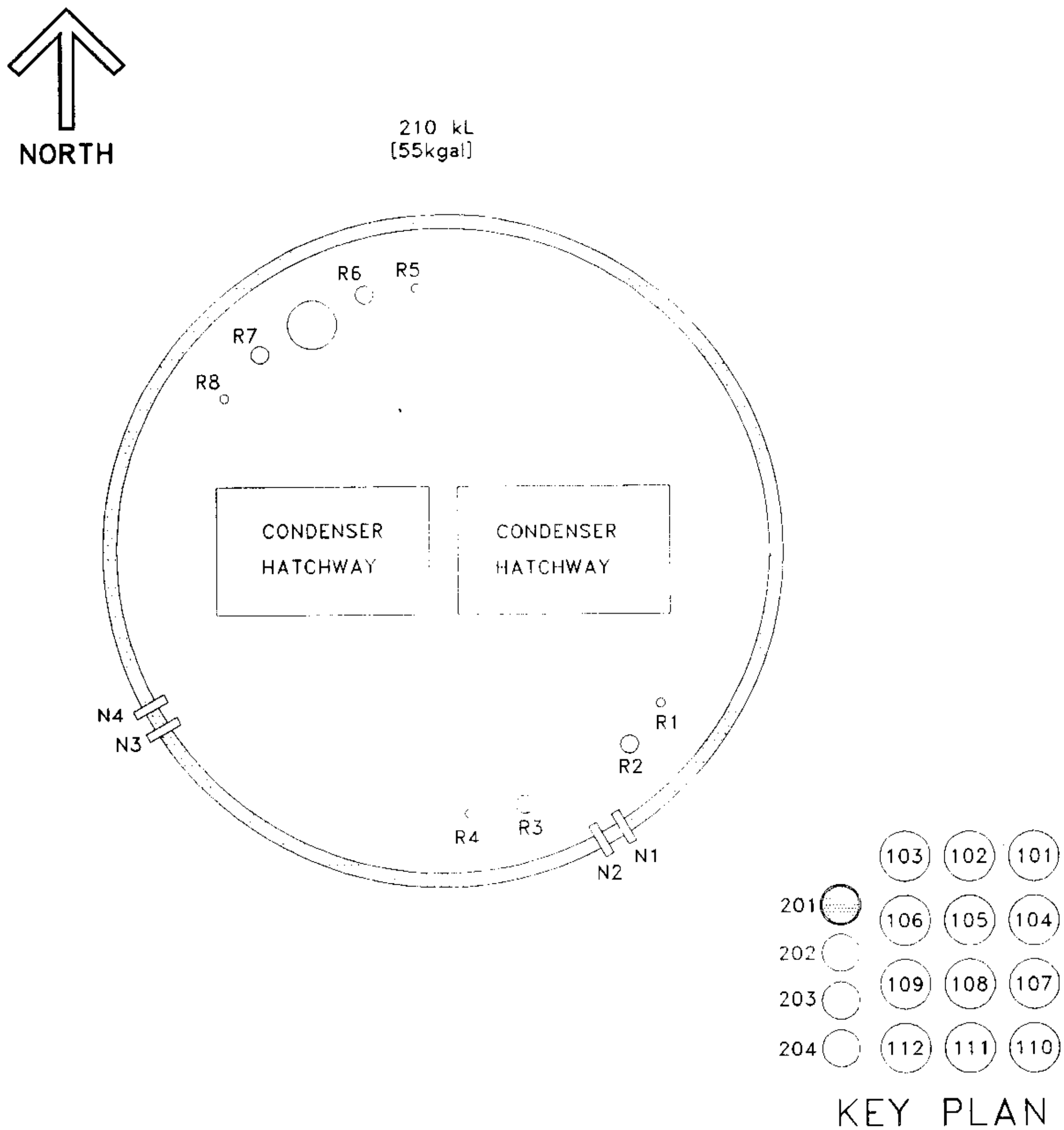
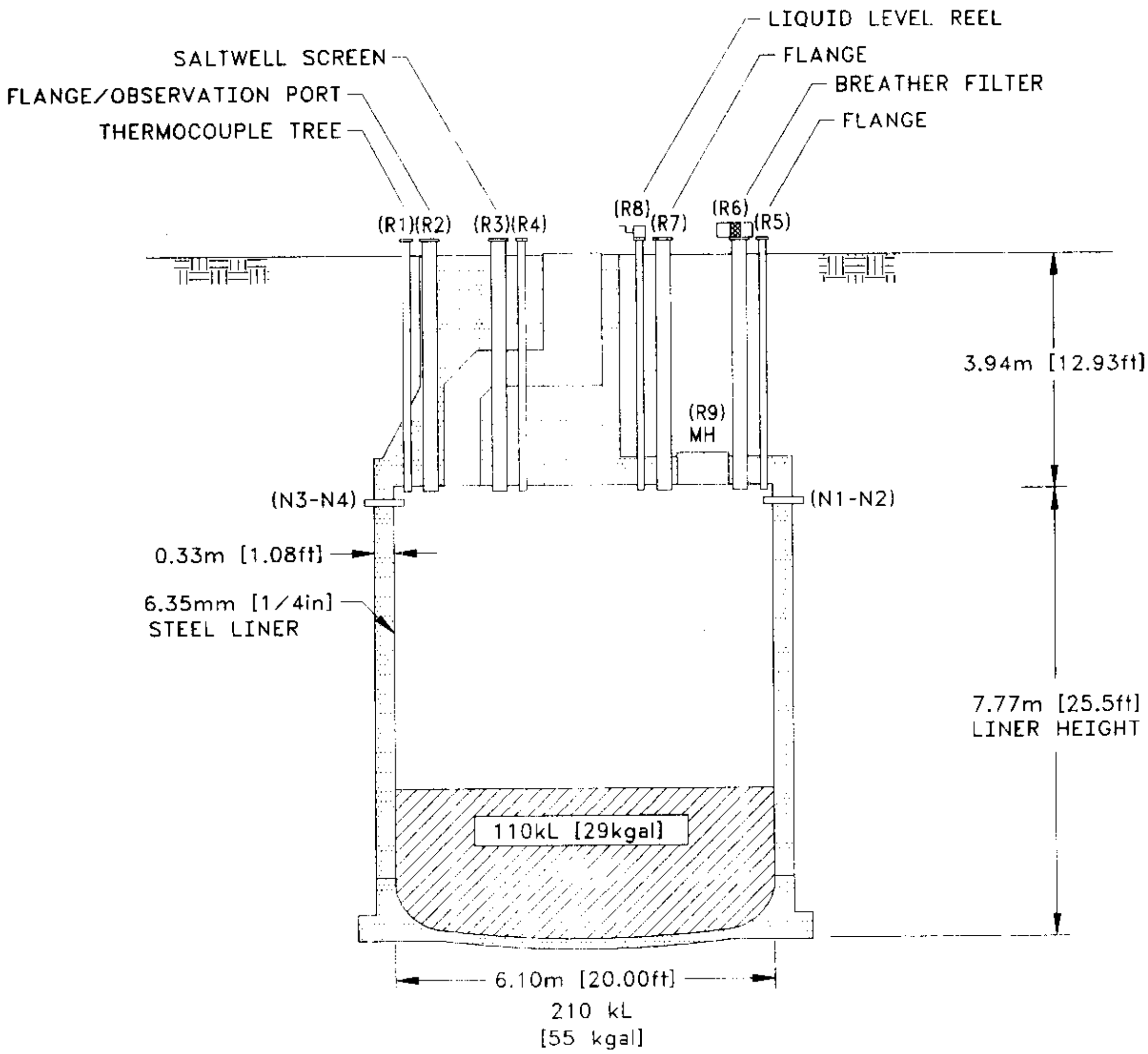


Figure A2-2. Cross-Section of Tank 241-B-201.



A3.0 PROCESS KNOWLEDGE

The following sections 1) provide information about the transfer history of tank 241-B-201, 2) describe the process wastes that made up the transfers, and 3) estimate the current tank contents based on transfer history.

A3.1 WASTE TRANSFER HISTORY

The process history for this tank is relatively straightforward. Tank 241-B-201 and the other three 210-kL (55-kgal) tanks in B Farm received waste from the LaF_3 plutonium concentration process (one of the final steps in the bismuth phosphate process) located in the 224 Building of B Plant.

According to the *Waste Status and Transaction Record Summary for the Northeast Quadrant* (WSTRS) (Agnew et al. 1996b), tank 241-B-201 was filled with 224 waste during the first quarter of 1952. Records indicate 224 waste was actively cascading from tank 241-B-201 to a crib through 1952; however, records do not provide volumes for any waste that may have been added to the tank after it was filled (Agnew et al. 1996b, Anderson 1990, Jungfleisch and Simpson 1993). Records also indicate the tank received flushes from B Plant during early 1953 as the tank was cascading waste to a crib; however, no waste volumes added to the tank are available. The transfer history is summarized in Table A3-1.

In the second quarter of 1958, the solid portion of the waste was estimated to be 106 kL (28 kgal). The tank remained almost full and inactive until 1971. In the second quarter of 1971, 83 kL (22 kgal) of supernate were transferred out of tank 241-B-201 to tank 241-B-106. During 1974 and 1975, five smaller supernate transfers were made from tank 241-B-201 to tank 241-B-109. In the fourth quarter of 1974, 15 kL (4 kgal) of flush water were added to the tank; in 1975, tank 241-B-201 was removed from service.

The total tank waste volume remained near 110 kL (29 kgal) from the third quarter of 1975 to the present time, except for the assumed leak of 4.5 kL (1.2 kgal) (Hanlon 1996). The total volume of solids in the tank is 106 kL (28 kgal), and the total volume of supernate is approximately 4 kL (1 kgal).

Table A3-1. Tank 241-B-201 Major Transfers.[1]

Transfer Source	Transfer Destination	Waste Type	Time Period	Estimated Volume	
				kL	kgal
224 Facility	---	224 waste	1952	210[2]	55[2]
---	241-B-106	Supernate	1971	-83	-22
Miscellaneous	---	Flush water	1974	15	4
---	241-B-109	Supernate	1974-1975	-64	-17

Notes:

[1]Agnew et al. (1996b).

[2]Agnew et al. (1996b), Anderson (1990), and Jungfleisch and Simpson (1993) indicate the tank was filled with 210 kL (55 kgal) of 224 waste in 1952, but suggest the tank may have received more because waste was actively cascading from the tank to a crib.

A3.2 HISTORICAL ESTIMATION OF TANK CONTENTS

Estimates of tank 241-B-201 contents are based on historical transfer data. The historical data include tank fill information from the WSTRS (Agnew et al. 1996b), waste stream composition estimates, and a description of solid waste layers within the tank. These data are combined in the *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3* (Agnew et al. 1996a) to provide a historical tank inventory estimate. In most cases, the available data are incomplete, thereby reducing the reliability of the transfer data and the derived modeling results. The TLM uses the WSTRS data to model the waste deposition processes and, using additional data from the HDW (which may introduce more error), generates an estimate of the solids layering. For these reasons, these model predictions are considered estimates that require further evaluation using analytical data.

Based on Agnew et al. (1996a), tank 241-B-201 contains a layer of 106 kL (28 kgal) of 224 waste and a layer of 3.8 kL (1 kgal) of supernate. Figure A3-1 is a graphical representation of the estimated waste type and volume for the tank layers. The 224 waste layer should contain iron, lanthanum, sodium, strontium, hydroxide, nitrate, and oxalate in concentrations above one weight percent. Bismuth, calcium, potassium, carbonate, fluoride, and phosphate should be present in quantitites greater than 0.1 percent. The 224 waste has a very low radionuclide content. Table A3-2 shows the historical tank inventory estimate of the expected waste constituents for tank 241-B-201.

Figure A3-1. Tank Layer Model.

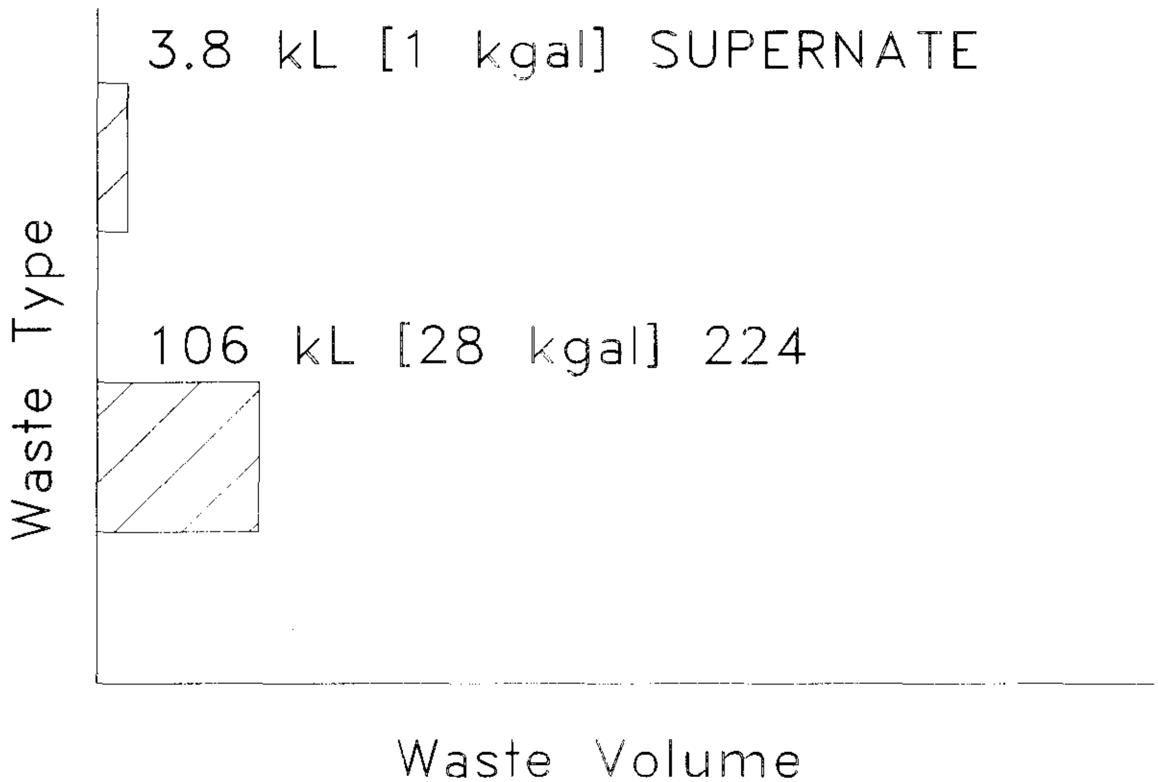


Table A3-2. Historical Tank Inventory Estimate.[1] (2 sheets)

Tank 241-B-201 Total Inventory Estimate[2]			
Physical Properties			
Total waste	1.50E+05 kg (29 kgal)		
Heat load	0 W (0 Btu/hr)		
Bulk density	1.36 g/mL		
Water	57.1 wt %		
TOC	1.08 wt % C (wet)		
Chemical Constituents	**M**	**ppm**	**kg**
Na^+	4.36	73,600	11,000
Al^{3+}	0	0	0
Fe^{3+} (total Fe)	0.349	14,300	2,140
Cr^{3+}	0.00332	127	19.0
Bi^{3+}	0.0583	8,940	1,340
La^{3+}	0.229	23,300	3,490
Hg^{2+}	0	0	0
Zr (as $ZrO(OH)_2$)	0	0	0
Pb^{2+}	0	0	0
Ni^{2+}	0.0013	55.8	8.36
Sr^{2+}	1.51	97,200	14,500
Mn^{4+}	0.00373	150	22.5
Ca^{2+}	0.235	6,920	1,040
K^+	0.220	6,300	943
OH^-	4.75	59,200	8,860
NO_3^-	1.28	58,300	8,720
NO_2^-	0	0	0
CO_3^{2-}	0.235	10,400	1,550
PO_4^{3-}	0.0932	6,490	971
SO_4^{2-}	0.0013	91.4	13.7
Si (as SiO_3^{2-})	0	0	0
F^-	1.96	27,400	4,100
Cl^-	0.0241	625	93.6
Citrate	0	0	0

Table A3-2. Historical Tank Inventory Estimate.[1] (2 sheets)

Tank 241-B-201 Total Inventory Estimate[2]			
Chemical Constituents	**M**	**ppm**	**kg**
$EDTA^{4-}$	0	0	0
$HEDTA^{3-}$	0	0	0
Glycolate	0	0	0
Acetate	0	0	0
Oxalate	0.621	40,100	6,000
DBP	0	0	0
Butanol	0	0	0
NH_3	0	0	0
$Fe(CN)_6^{4-}$	0	0	0
Radiological Constituents	**Ci/L**	**μCi/g**	**Ci**
Pu	---	0.00977	0.0244 (kg)
U	0 (M)	0 (μg/g)	0 (kg)
Cs	0	0	0
Sr	0	0	0

Notes:

[1]Agnew et al. (1996a).

[2]Historical tank content estimate predictions have not been validated.

A4.0 SURVEILLANCE DATA

Tank 241-B-201 surveillance consists of surface level measurements (liquid and solid), temperature monitoring inside the tank (waste and headspace), and leak detection well (drywell) monitoring for radioactivity outside the tank. The data provide the basis for determining tank integrity.

Liquid level measurements can indicate if the tank has a major leak. Solid surface level measurements indicate physical changes in and consistencies of the solid layers of a tank. Drywells located around the perimeter of the tank may show increased radioactivity caused by leaks.

A4.1 SURFACE LEVEL READINGS

Tank 241-B-201 is categorized as an assumed leaker. The waste surface level is monitored through riser 8 with a manual tape gauge. A surface level measurement of 3.86 m (12.66 ft) was recorded on October 21, 1996. This is equivalent to a waste volume of 110 kL (29 kgal).

In 1971, the tank's integrity was questioned because of a slowly decreasing liquid level and increasing activity in a nearby drywell (Welty 1988). A liquid level decrease in 1974 exceeded the 1.27 cm (0.5 in.) allowable limit, and the remaining supernate was removed. The tank was recategorized as an assumed leaker (confirmed leaker) in January 1980. An operation limit deviation report (No. 82-04) was issued in April 1982 because the liquid level reached the 2.5 cm (1 in.) decrease criterion. Photographs taken February 18, 1982, confirmed that a liquid level decrease had occurred. The most recent photographs were taken on November 12, 1986.

Figure A4-1 shows a level history graph of surface level measurements. The level history data for the first and second quarter of 1957 and between the fourth quarter of 1959 and the second quarter of 1962 are questionable because the solids volume exceeds the total waste volume.

A4.2 INTERNAL TANK TEMPERATURES

Tank 241-B-201 has a single thermocouple tree in riser 1 with 12 thermocouples to monitor the waste temperature. The elevations of the thermocouples are unknown (Tran 1993). Tank temperatures are monitored semiannually. On January 9, 1996, the maximum temperature measured in the tank was 15.8 °C (60.6 °F) on thermocouples 1 and 5; the lowest temperature on the same date was 14.5 °C (58.1 ° F) on thermocouple 9.

Figure A4-2 shows the historical temperature data from the tank. Data are available from 1975 to the present; however, complete data is missing for some thermocouples, and there is a gap in the data for all thermocouples from 1980 to July 1989. The average temperature of the historical data is 16.6 °C (61.9 °F), the maximum is 26.7 °C (80.0 °F), and the minimum is 10.2 °C (50.3 °F). Plots of individual thermocouple readings are in Brevick et al. (1996).

Figure A4-1. Tank Waste Level Summary for Tank 241-B-201.

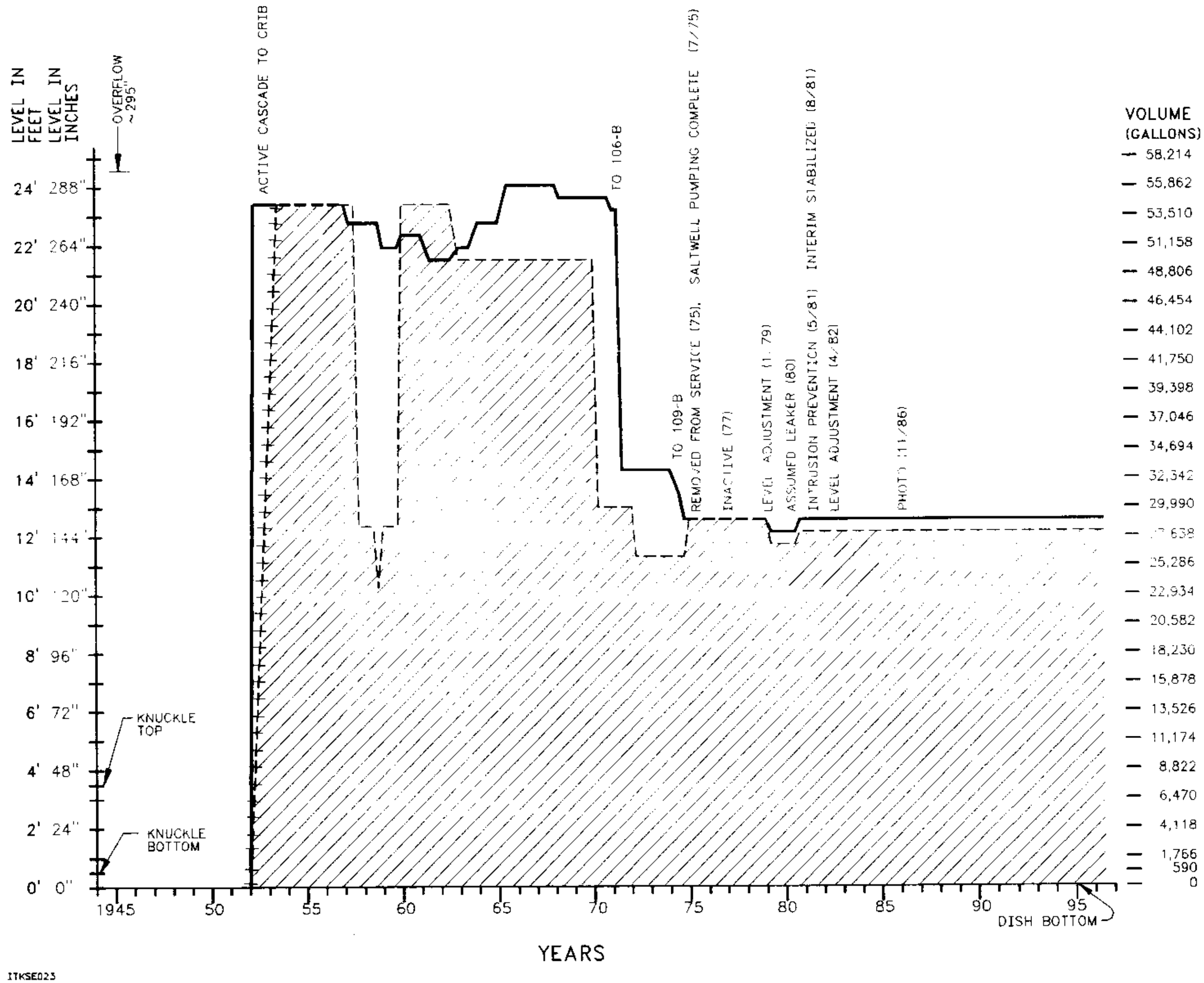
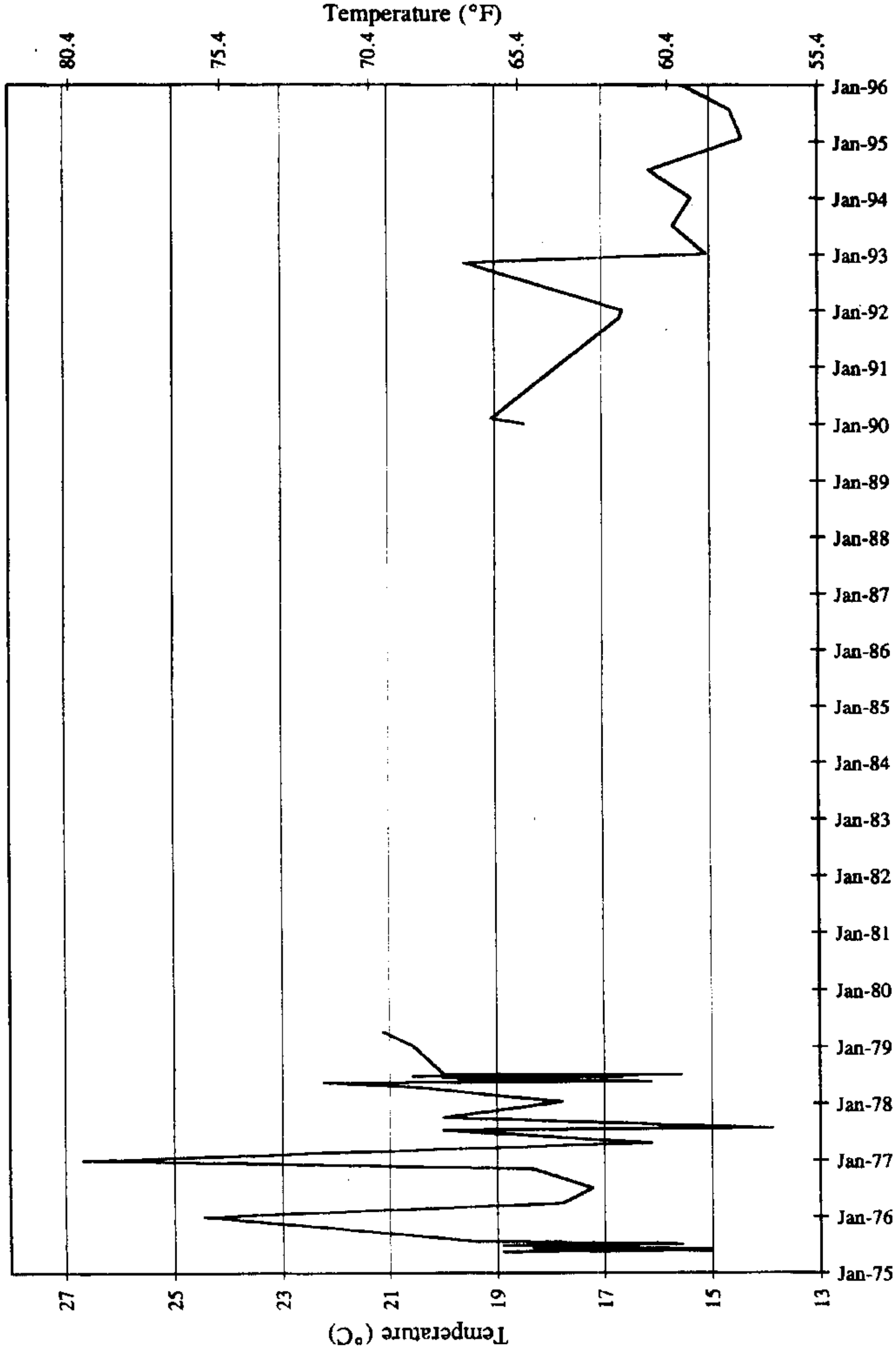


Figure A4-2. Thermocouple Data for Tank 241-B-201.



A4.3 TANK 241-B-201 PHOTOGRAPHS

The most recent set of interior tank photographs were taken on November 12, 1986 (Brevick et al. 1996). Because no transfer activity has occurred since this date, the photographs should accurately show the current waste. The montage has labels identifying some monitoring equipment, piping, and risers in the tank. The montage may be viewed in Brevick et al. (1996). Most of the surface is not visible. In places, it appears that the waste surface is a reddish-orange color. The white spot in the photograph is the result of a camera flash. A discarded measurement tape is visible on the surface. The thermocouple tree, manual tape, and a pipe in riser 5 are visible also. An earlier set of photographs, taken February 18, 1982, is much more clear indicating the surface is mostly wet except for a band along the east wall of the tank.

A5.0 APPENDIX A REFERENCES

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APPENDIX B

SAMPLING OF TANK 241-B-201

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APPENDIX B

SAMPLING OF TANK 241-B-201

Appendix B provides sampling and analysis information for each known sampling event for tank 241-B-201, and it assesses the 1991 core sampling results.

Appendix B contains the following information:

- **Section B1**: Tank Sampling Overview
- **Section B2**: Analytical Results
- **Section B3**: Assessment of Characterization Results
- **Section B4**: References for Appendix B

Future sampling of tank 241-B-201 will be appended to the above list.

B1.0 TANK SAMPLING OVERVIEW

This section describes the latest tank 241-B-201 core sampling event, which occurred in July 1991. The sampling and analyses were performed in accordance with Revision 2 of the *Waste Characterization Plan for the Hanford Site Single-Shell Tanks* (Winters et al. 1990). Because the sampling event predated DQOs, no DQOs were applicable. For further discussions of the sampling and analysis procedures, refer to the *Tank Characterization Reference Guide* (DeLorenzo et al. 1994). A 1978 core sampling event is discussed in Section B1.4. The June 1996 vapor flammability screening is discussed in Section B1.5.

B1.1 DESCRIPTION OF SAMPLING EVENT

In 1991, two core samples were taken from tank 241-B-201. Because the waste was expected to be relatively soft, the push-mode sampling method was used. Normal paraffin hydrocarbons were used as a hydrostatic head fluid during sampling. Core 26 was taken from riser 2 on July 23 and 24, and core 27 was taken from riser 7 between July 30 and August 3. Risers 2 and 7 are located at opposite ends of the tank; riser 2 is near the waste inlet pipe. Because the tank history indicates the tank was used to settle solids from 224 waste and because this waste has not been disturbed by sluicing or by tank transfers, the coarser solids should have settled out at core 26 and the finer solids at core 27.

The two cores should therefore provide estimates of the extremes occurring in the waste. However, the data were analyzed as though the two cores were random samples from the tank.

The waste in the tank is relatively deep (4 m [13 ft]). In both cores, eight segments were required to produce a complete column of waste. Segment 1 is taken from the top of the waste, and segment 8 is a bottom sample. For this sampling event, there were no recovery problems because the sampler recovered almost 100 percent of the core and segment samples. Segment 1 of core 26 had the lowest recovery (65 percent). While this may seem low, the typical sampling protocol is to partially fill the first segment of a sample so that the rest of the waste column can be divided into whole segments. In fact, the planned recovery for this segment was 70 percent. The planned recovery for all other segments was 100 percent. Table B1-1 shows the percent recoveries achieved.

Table B1-1. Actual Percent Recovery in Tank 241-B-201.

Segment	Core 26	Core 27
1	65%/70%[1]	100%/100%[1]
2	95%	100%
3	100%	100%
4	100%	100%
5	100%	100%
6	100%	100%
7	100%	100%
8	100%	100%

Note:

[1]Actual/planned.

Although DQOs were not applicable to this sampling event, the sampling conditions would meet the requirements of the current DQOs. The sampling riser locations were separated radially to the maximum extent possible, and a full vertical profile of the waste was obtained from both cores.

B1.2 SAMPLE HANDLING

The samples were transported to Battelle's 325-A Laboratory for extrusion and analysis. Core 26, segments 1, 2, and 3 were delivered to the 325-A Laboratory on July 25, 1991; core 26, segments 7 and 8 were delivered on July 29, 1991; core 26, segments 4, 5, and 6 were delivered on July 30, 1991; core 27, segments 1, 2, and 3 were delivered on August 5, 1991; core 27, segments 4, 5, and 6 were delivered on August 7, 1991; and core 27, segments 7 and 8 were delivered on August 8, 1991.

Table B1-2 provides sampling and extrusion information including sample descriptions.

Each segment from both cores was photographed in the extrusion tray. Although the photographs were included in the original TCR (Heasler et al. 1994), they are not included here because the quality of the photographs is poor. For core 26, segments 1 through 8 are labeled 91-042 through 91-049, respectively. For core 27, segments 1 through 8 are labeled 90-050 through 90-057, respectively.

Figure B1-1 contains a flowchart of the steps taken by the 325-A Laboratory to analyze tank core samples.

Each segment from cores 26 and 27 was homogenized. The homogenized samples were prepared in the Shielded Analytical Laboratory (SAL). Because of the low level of radioactivity associated with the sludge from tank 241-B-201, many analytical preparations were completed in the 325-A Laboratory (not the SAL). Segments 3 and 7 from core 26 and segments 3 and 6 from core 27 were subsampled for the homogenization test analyses. These subsamples were acid digested and analyzed by two methods: inductively coupled plasma (ICP) atomic emission spectroscopy and gamma energy analysis (GEA). The homogenization test results for the eight segments from core 27 indicated that homogenization was insufficient. The segments were reblended and subsampled for preparation and analysis in the same manner as before. It was noted by the analyst during the preparation of the core 27 sludge that it had a greasy appearance. It was also noted that during acid digestion of the homogenization check sample, a white precipitate formed when hydrochloric acid was added. No precipitate was present while the sample was in a nitric acid media. Hydrofluoric acid and oxalic acid were added to the digestate, and total dissolution was achieved. The homogenization test results are discussed in detail in Section B3.2.

Two core composite samples were produced from each core. Homogenization test samples for the four composite samples were prepared by caustic fusion and analyzed. The results of these tests are discussed in Section B3.2.

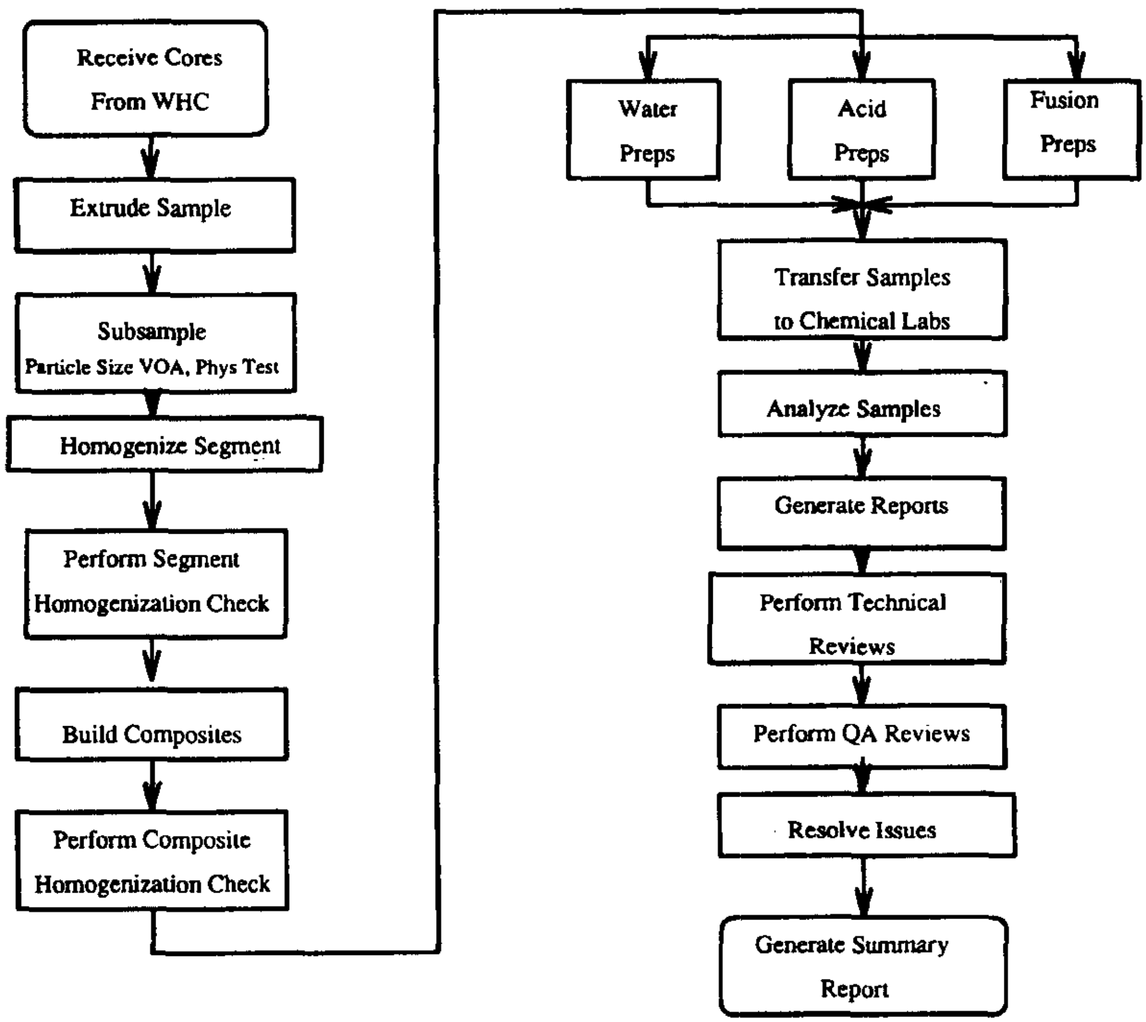
Table B1-2. Tank 241-B-201 Sampling Information and Sample Descriptions.

Segment	Sample ID	Mass (g)	Volume (mL)	Sample Characteristics
Core 26 - Riser 2				
1	91-042	DL = 55.7	DL = 57	Only segment to contain DL. First portion of DL was tan to gray, followed by a dark brown portion. All of the DL was opaque.
		155	121	Solids were a sticky dark brown sludge which held their shape upon extrusion. The consistency of the solids from segments 1 and 2 varied from soft at the top of segment 1 to crumbly at the bottom of segment 2.
2	91-043	254	177	
3	91-044	225	187	Dark brown to charcoal in color. Had a smooth texture but extruded in chunks.
4	91-045	230	187	
5	91-046	229	187	Color varied from charcoal to black. Had a smooth texture but extruded in chunks. Waste contained a substantial amount of moisture. In segment 7, there were small pockets (less than 1 mL) of liquid trapped in the sludge.
6	91-047	235	187	
7	91-048	238	187	
8	91-049	237	187	
Core 27 - Riser 7				
1	90-050	230	187	The top 5 to 7.6 cm (2 to 2.5 in.) of the core were dark brown. The remainder of the core was a shiny black, moist sludge. Although the waste contained a substantial amount of moisture, no drainable liquids were obtained. The core material was fairly stiff, except for the top 2.5 cm (1 in.) of segments 2, 3, 4, and 5, which flowed upon extrusion.
2	90-051	225	187	
3	90-052	229	187	
4	90-053	232	187	
5	90-054	240	187	
6	90-055	241	187	
7	90-056	233	187	
8	90-057	234	187	

Notes:

DL = drainable liquid
ID = identification

Figure B1-1. Sample Preparation Flowchart.



To prepare the core composite samples for analysis, the samples were digested by fusion, acid, or water digestion. For core 26, two fusion digestions were made before the ICP analyses: a KOH fusion in a Ni crucible and a Na_2O_2 fusion in a Zr crucible. Only the KOH fusion was performed for core 27. For all other analyses requiring a fusion digestion, only the KOH fusion was performed. The fusion digestions were done according to procedure PNL-ALO-102, "Fusion of Hanford Tank Waste Solids." The acid digestions were done following procedure PNL-ALO-101, "Acid Digestion of Metals Analysis" (that is, HNO_3/HCl). The core composite samples were water leached using procedure PNL-ALO-103, "Water Leach of Sludges, Soils, and other Solid Samples" (Pool 1994).

B1.3 SAMPLE ANALYSIS

An extensive set of analyses were required by Winters et al. (1990) including tests for chemical, physical, rheological, and thermodynamic properties. Table B1-3 lists the preferred methods used to assay tank 241-B-201 samples for the suite of requested analyses. For each analyte, the preferred method produces the best estimate of concentration for that particular constituent.

Caustic fusion, acid digestion, and water leach preparations of all core composite samples were completed in the SAL. Tests requiring little or no sample preparation such as weight percent solids, direct total carbon (TC), direct total inorganic carbon (TIC), direct total organic carbon (TOC), carbon-14, and pH — were conducted in-cell. Because of the low level of radioactivity, aliquots were provided directly to the 325-A Laboratory for mercury, toxicity characteristic leaching procedure (TCLP), semivolatile organic analysis, and extractable organic halides analysis.

The SAL made deliberate minor deviations to sample preparation procedures for one or more of the following reasons:

- Insufficient sample was available to conduct the analyses per the specified procedure, and still maintain the level of quality control requested.
- Sample weights and/or final volumes were reduced to facilitate waste minimization.
- Sample weights and/or final volumes were altered to increase the concentration of certain analytes of interest. This was done to meet the concentration ranges needed to perform the analyses as specified in the procedures.

These deviations are not expected to have a substantial impact on analytical results or on conclusions derived from them.

Table B1-3. Sample Preparation and Analytical Methods Used on Tank 241-B-201 Samples. (2 sheets)

Analyte	Sample Prep.	Preferred Method	Analyte	Sample Prep.	Preferred Method
Aluminum	A, F, W	ICP:A	Antimony	A, F, W	ICP:A
Arsenic	A, F, W	ICP:A	Barium	A, F, W	ICP:A
Bismuth	A, F, W	ICP:F	Beryllium	A, F, W	ICP:A
Boron	A, F, W	ICP:A	Cadmium	A, F, W	ICP:A
Calcium	A, F, W	ICP:A	Cerium	A, F, W	ICP:A
Chromium	A, F, W	ICP:A	Cobalt	A, F, W	ICP:A
Copper	A, F, W	ICP:A	Dysprosium	A, F, W	ICP:A
Europium	A, F, W	ICP:A	Gadolinium	A, F, W	ICP:A
Iron	A, F, W	ICP:F	Lanthanum	A, F, W	ICP:A
Lead	A, F, W	ICP:A	Lithium	A, F, W	ICP:A
Magnesium	A, F, W	ICP:A	Manganese	A, F, W	ICP:A
Molybdenum	A, F, W	ICP:A	Neodymium	A, F, W	ICP:A
Nickel	A, F, W	ICP:A	Palladium	A, F, W	ICP:A
Phosphorus	A, F, W	ICP:F	Potassium	A, F, W	ICP:A
Rhodium	A, F, W	ICP:A	Ruthenium	A, F, W	ICP:A
Selenium	A, F, W	ICP:A	Silicon	A, F, W	ICP:F
Silver	A, F, W	ICP:A	Sodium	A, F, W	ICP:F
Strontium	A, F, W	ICP:A	Tellurium	A, F, W	ICP:A
Thallium	A, F, W	ICP:A	Thorium	A, F, W	ICP:A
Tin	A, F, W	ICP:A	Titanium	A, F, W	ICP:A
Tungsten	A, F, W	ICP:A	Vanadium	A, F, W	ICP:A
Yttrium	A, F, W	ICP:A	Zinc	A, F, W	ICP:A
Zirconium	A, F, W	ICP:A	Chloride	W	IC:W
Cyanide	W	IC:W	Fluoride	W	IC:W
Nitrate	W	IC:W	Nitrite	W	IC:W
Phosphate	W	IC:W	Sulfate	W	IC:W
Ammonia	W	ISE:W	Mercury	A	CVAA:A
$^{243/244}Cm$	F	Alpha Radchem:F	Gross alpha	F	Alpha Radchem:F
^{237}Np	F	Alpha Radchem:F	^{238}Pu	F	Alpha Radchem:F
$^{239/240}Pu$	F	Alpha Radchem:F	Total alpha	F, W	Alpha Radchem:F
Gross beta	F, W	Beta Radchem:F	^{90}Sr	F	Beta Radchem:F
^{99}Tc	F	Beta Radchem:F	^{241}Am	A, F, W	GEA:F

Table B1-3. Sample Preparation and Analytical Methods Used on Tank 241-B-201 Samples. (2 sheets)

Analyte	Sample Prep.	Preferred Method	Analyte	Sample Prep.	Preferred Method
^{144}Ce	A, F, W	GEA:F	^{134}Cs	A, F, W	GEA:F
^{137}Cs	A, F, W	GEA:F	^{60}Co	A, F, W	GEA:F
^{154}Eu	A, F, W	GEA:F	^{155}Eu	A, F, W	GEA:F
^{40}K	A, F, W	GEA:F	Uranium	F	Laser Fluorimetry:F
^{239}Pu	F	Mass Spectrometry:F	^{240}Pu	F	Mass Spectrometry:F
^{241}Pu	F	Mass Spectrometry:F	^{242}Pu	F	Mass Spectrometry:F
^{234}U	F	Mass Spectrometry:F	^{235}U	F	Mass Spectrometry:F
^{236}U	F	Mass Spectrometry:F	^{238}U	F	Mass Spectrometry:F
Tritium	W	Liq. Scintillation:W	^{14}C		Liq. Scintillation:W
^{59}Ni	A	Liq. Scintillation:A	^{63}Ni	A	Beta Radchem:F
TOC	D, W	Persulfate Oxidation:D	Hexavalent Chromium	W	Calorimetric:W
Total carbon	D, W	Persulfate Oxidation:W	TIC	D,W	Persulfate Oxidation:W
SVOA	n/a	GC/MS	VOA	n/a	GC/MS

Notes:

A	=	acid digestion
CVAA	=	cold vapor atomic absorption
D	=	direct analysis
F	=	KOH/Ni fusion
GC/MS	=	gas chromatography/mass spectrometry
IC	=	ion chromatography
ISE	=	ion-selective electrode
Liq.	=	liquid
n/a	=	not applicable
SVOA	=	semi-volatile organics analysis
VOA	=	volatile organics analysis
W	=	water digestion

No attempt was made to meet the holding times for these samples. The samples were received from Westinghouse Hanford Company by August 8, 1991. Analyses were not started until January 1992. This delay was caused by waste disposal issues in the 325 Building.

A total of 7,598 analytical measurements were made on tank 241-B-201. Table B1-4 summarizes the analytical result counts. The most complete segment-level analyses were performed on physical properties. The majority of segment-level chemical analyses were homogenization tests. The only exceptions are segments 1, 3, and 7 of core 26, which were analyzed for volatile organics. Nearly 33 percent of all analytical results in the tank 241-B-201 dataset are quality control (QC) data (that is, matrix spikes, method blanks, etc.). If the homogenization test data is included as QC data, this percent goes up to 59 percent (that is, more than one-half of the analytical results in the tank 241-B-201 dataset were taken for QC reasons).

Table B1-4. Summary of Tank 241-B-201 Analytical Result Counts.

		Segment								
		1	2	3	4	5	6	7	8	Composite
Physical Properties	Core 26	8	43	7	5	43	5	5	43	8
	Core 27	27	27	15	27	27	23	19	19	0
Chemical Analyses	Core 26	74	0	283	0	0	0	274	0	1,682
	Core 27	0	0	404	0	0	400	0	0	1,641
QC Data		108	0	231	0	0	100	134	0	1,907
Totals		217	70	940	32	70	528	432	62	5,238
		Grand total (segment total + composite total) = 7,598								

The core composite data were used primarily to determine mean concentrations and inventories for tank 241-B-201. The segment-level data were used, however, for the analysis of physical properties.

B1.4 DESCRIPTION OF HISTORICAL SAMPLING EVENT

In 1978, core samples were taken from all four 55,000-gallon tanks in the B Tank Farm. There is no information indicating where the core samples were taken within the tanks. These core samples were sent to the Chemical Sciences Group for characterization (Horton 1978).

The chemists noted that core samples were black in color and had the consistency of soft grease. There is no information about core recovery. However, personnel who operated core sampling equipment during that period indicated that the equipment operated reasonably well in the type of waste described by the chemists. Section B2.9 presents the analytical results from the 1978 core sample.

B1.5 TANK 241-B-201 VAPOR FLAMMABILITY SCREENING

On June 4, 1996, the tank headspace was screened for flammability concerns by combustible gas monitoring. The results are shown in Table B1-5. Because the results indicate the headspace is below 10 percent of the lower flammability limit (0 percent), the vapor flammability issue of the safety screening DQO (Dukelow et al. 1995) can be closed.

Table B1-5. Tank 241-B-201 Headspace Flammability Screening Results, June 4, 1996.

Measurement	Result
Lower flammability limit	0%
Oxygen	21%
Total organic crbon	0 ppm
Ammonia	< 5 ppm

B2.0 ANALYTICAL RESULTS

B2.1 OVERVIEW

This section summarizes the sampling and analytical results associated with the July 1991 core sampling of tank 241-B-201. The following sections discuss the methods used in analyzing the core samples. Because of the large size of the data set, discussion of analytical procedures is first, followed by the data tables. The chemical, physical, and thermodynamic analytical presentation tables are listed in Table B2-1. All results were taken from Pool (1994).

Table B2-1. Analytical Presentation Tables.

Analysis	Table Number
Metals by graphite furnace atomic absorption	B2-2 through B2-4
Metals by cold vapor atomic absorption	B2-5
Metals by toxicity characteristic leaching procedure	B2-6 through B2-13
Metals by inductively coupled plasma spectroscopy	B2-14 through B2-59
Hexavalent chromium by colorimetry	B2-60
Uranium by laser fluorimetry	B2-61
Anions by ion chromatography	B2-62 through B2-68
Ammonia by ion selective electrode	B2-69
Extractable organic halides	B2-70
Nondetected semivolatile organics	B2-71
Semivolatile organics	B2-72 through B2-79
Nondetected volatile organics	B2-80
Volatile organics	B2-81 through B2-85
Analyses for TC/TOC/TIC	B2-86 through B2-91
Radionuclides by alpha proportional counting	B2-92 through B2-93
Radionuclides by alpha energy analysis	B2-94 through B2-98
Radionuclides by mass spectrometry	B2-99 through B2-107
Radionuclides by beta proportional counting	B2-108 through B2-110
Radionuclides by gamma energy analysis	B2-111 through B2-118
Radionuclides by liquid scintillation	B2-119 through B2-121
Analyses for nickel isotopes	B2-122 and B2-123
Analyses for physical properties	B2-124 through B2-128
Analyses for rheological properties	B2-129 through B2-132
Analyses for thermodynamic properties	B2-133 and B2-134

A complete validation was performed on the data. Many QC and quality assurance parameters were investigated during the validation including standard recoveries, spike recoveries, duplicate analyses, and blanks. Pool (1994) provides the complete data validation information. Refer to Section B3.3 for more information about the QC investigation and a summary of data validation findings.

B2.2 INORGANIC ANALYSES

B2.2.1 Graphite Furnace Atomic Absorption

Graphite furnace atomic absorption (GFAA) analyses (for antimony, arsenic, and selenium) were performed on the core composite samples following an acid digestion. The samples were analyzed according to one of the following procedures: PNL-ALO-219 ("Antimony [Atomic Absorption, Furnace Technique]"), PNL-ALO-214 ("Arsenic [Atomic Absorption, Furnace Technique]"), or PNL-ALO-215 ("Selenium [Atomic Absorption, Furnace Technique]"). Arsenic and selenium were analyzed from HNO_3 digestions, and antimony was analyzed from HNO_3/HCl digestions.

B2.2.2 Cold Vapor Atomic Absorption

Mercury was analyzed in the core composite samples by cold vapor atomic absorption (CVAA) following a modification of procedure PNL-ALO-213, "Mercury in Water, Solids, and Sludges by Manual Cold Vapor Technique" (Pool 1994).

B2.2.3 Toxicity Characteristic Leaching Procedure

A TCLP was performed on the core 27 composite samples only. The samples were leached following procedure PNL-ALO-110, "Toxicity Characterization Leaching Procedure Extraction for Inorganic Contaminants." The leachate was digested using acid to determine the concentrations of silver, arsenic, barium, cadmium, chromium, lead, and selenium using ICP. Mercury was analyzed in the leachate using CVAA (Pool 1994).

The only analyte which approached the regulatory level was chromium; all other analytes were significantly below the regulatory level. Chromium ranged from 3.3 to 3.4 mg/L, with the limit being 5.0 mg/L. The low TCLP results for chromium were surprising, because significantly higher results were anticipated and the TCLP results do not correlate well with the core composite water leach results. Refer to Pool (1994) for more detail about the TCLP results.

B2.2.4 Inductively Coupled Plasma

Analyses for the waste metallic constituents were performed by ICP. The ICP analyses were run after fusion, acid, and water digestions. Two fusions were used to prepare the samples. Data from both fusions (KOH fusion in a Ni crucible and Na_2O_2 fusion in a Zr crucible) are shown in the data tables. It should be noted that for all analytes except potassium and nickel, only the KOH fusion data were used in computing means. For potassium and nickel, the Na_2O_2 fusion data were used in determining means, because the data for these analytes from the KOH fusion was invalid due to contamination from the digestion and the crucible. The ICP analyses were performed following procedure PNL-ALO-211, "Determination of Elements by Inductively Coupled Argon Plasma Atomic Emission Spectrometry." All interelement corrections for spectral interferences were performed online and the reported instrument detection limits were determined in accordance with the statement of work and technical project plan requirements (Pool 1994).

B2.2.5 Colorimetry

Analyses for chromium (VI) were performed by colorimetry on composite samples which had been water leached. The analyses were performed according to procedure PNL-ALO-227, "Determination of Cr(VI) in Aqueous Samples" (Pool 1994).

B2.2.6 Laser Fluorimetry

Total uranium concentrations were measured in the fusion composite samples using laser fluorimetry. No procedure number was provided in Pool (1994).

B2.2.7 Ion Chromatography

The IC analyses were performed according to procedure PNL-ALO-271 ("Determination of Inorganic Anions by Ion Chromatography") after a water digestion. An analysis was also performed for free cyanide following procedure PNL-ALO-271, "Procedure of Analysis of Free Cyanide in Water and Solid Sample Leachates." The lowest calibration standard for each analyte is defined as the method detection limit (Pool 1994).

B2.2.8 Ion Selective Electrode

Using procedure PNL-ALO-226 ("Ammonia [Nitrogen] in Aqueous Samples"), analyses for ammonia were performed on core composite samples which had been water leached. It should be noted that no distillation procedure is performed on the samples and the ISE analysis is performed directly on the leachates (Pool 1994).

B2.3 ORGANIC ANALYSES

B2.3.1 Extractable Organic Halides

The core composite samples were extracted and analyzed following method PNL-ALO-320 ("Extractable Organic Halides") using a microcoulometric titration halogen analyzer.

B2.3.2 Semivolatiles

Semivolatile organic compounds were analyzed on the core composite samples by gas chromatography/mass spectrometry (GC/MS) using procedure PNL-ALO-345 ("GC/MS for Semivolatiles"). The only Contract Laboratory Program target compound found was bis(2-ethylhexyl)phthalate, and its results were well below the contract required quantitation limit. The tentatively identified compounds in core 26 were unknown (appeared to be primarily oxidized organics) or 2,6 bis(1,1-dimethylethyl)-4-methylphenol, an anti-oxidant preservative that may have come from materials used in the laboratory upgrade taking place in the adjoining laboratory. The tentatively identified compounds in core 27 were dodecane, tridecane, tetradecane, and pentadecane. These are components of the normal paraffin hydrocarbons used as a hydrostatic drilling fluid during sampling.

B2.3.3 Volatiles

Segments 1, 3, and 7 from core 26 were analyzed for volatile organic compounds by GC/MS. These samples were known to contain percent level quantities of normal paraffin hydrocarbons (Pool 1994), used as a hydrostatic head fluid during sampling operations. Analysis was performed following procedure PNL-ALO-335, "GC/MS for Volatile Compounds." Because of the long hold time for these samples, the presence or absence of Contract Laboratory Program target compounds and their quantitation should be interpreted as qualitative at best (Pool 1994).

Toluene was the only volatile organic compound found in the samples in concentrations above the contract required quantitation limit. Three silicone compounds, methoxytrimethylsilane, trimethyl silanol, and hexamethyl disiloxane, were tentatively identified in several samples in concentrations at the part per million levels (Pool 1994).

B2.4 CARBON ANALYSES

Results for TOC, TIC, and TC were obtained during the same analysis. Therefore, the discussion of the analytical method for the three analytes has been combined.

B2.4.1 TOC/TIC/TC

The TOC/TIC/TC analyses were performed on water leach solutions from the core composite samples and on the "as received" material from the composite samples. After leaching, the samples were analyzed following procedure PNL-7-40.7, "Solution Analysis: Carbon." Direct TOC/TIC/TC analyses on each core composite sample were performed following procedure PNL-ALO-381, "Determination of TC, TOC, and TIC in Radioactive Liquids, Soils, and Sludges by Hot Persulfate Method." It should be noted that the TIC and TOC results for the direct analysis were about twice as high as those obtained from the water leach analysis for core 26, while the results from the two analyses were about the same for core 27.

B2.5 RADIONUCLIDE ANALYSES

Procedure numbers were not provided in Pool (1994) for the radiochemical analyses. Winters et al. (1990) contains the full set of procedure numbers.

B2.5.1 Alpha Activity

The total alpha activity was determined on both fusion digested and water digested core composite samples by drying a small aliquot on a counting planchet and counting using a scintillation detector. The water digestion was performed only on the core 26 composite samples. Pool (1994) states that for the fusion digested samples, the Pu, Am/Cm, and Np fractions were separated by ion exchange and/or solvent extraction procedures and counted by alpha proportional counting. Alpha energy analysis (AEA) was used to determine the ^{238}Pu and $^{239/240}$Pu ratios for Pu and the ^{241}Am and $^{243/244}$Cm ratios for Am. These ratios were used to report separate activities for each isotope. However, for core 27, only total Pu is reported. (The mass spectrometry data below indicates that $^{239/240}$Pu accounts for > 99.9 percent of total Pu.) Also, $^{243/244}$Cm is not reported for core 27.

There was a deviation in the Am/Cm analysis for these samples. Because the Pu was not totally removed in the separation, the contribution of ^{238}Pu to the ^{241}Am was subtracted using the AEA of the separated Pu (Pool 1994).

B2.5.2 Mass Spectrometry

Thermal ionization mass spectrometry was used to determine the presence of all isotopes of Pu and U. Uranium and plutonium values were consistent with typical fuel burn up. Because of the low ^{238}Pu concentration and the high uranium concentration in the samples, the uranium contamination in the purified Pu fraction interfered with the mass spectrometric determination of ^{238}Pu. Therefore, ^{238}Pu was determined by AEA. Because of the small quantity of Pu in the samples and the low isotopic abundance of ^{241}Pu and ^{242}Pu, values reported for these isotopes are best estimates only (Pool 1994).

B2.5.3 Total Beta Activity

Analysis of the total beta activity was performed on the composite samples from both cores after a fusion digestion and on the core 26 composite samples after a water digestion. The total beta values were determined by drying a small aliquot of each solution and counting in a beta proportional counter. ^{90}Sr and ^{99}Tc were also measured by beta counting after separating each fraction by ion exchange and/or solvent extraction (Pool 1994).

B2.5.4 Gamma Energy Analysis

A GEA was performed on core composite samples and homogenization test samples after fusion digestion. Results were obtained for ^{241}Am, ^{144}Ce, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{154}Eu, ^{155}Eu, and ^{40}K. Not all listed radionuclides were measured in every sample. The homogenization test samples were also analyzed after subjection to an acid digestion, and analyses for ^{134}Cs, ^{137}Cs, and ^{40}K were performed after a water leach on the core 26 composite samples. All GEA results were decay corrected to January 1, 1992.

The cesium fusion digest results reflected a problem encountered in homogenizing the waste material. The ^{137}Cs sample and duplicate results were not in good agreement. Results for other analytes showed much better agreement. A re-homogenization was tried with little success. It was hypothesized that cesium may be present in an insoluble form inhibiting homogenization (Pool 1994).

B2.5.5 Liquid Scintillation Counting

Tritium was measured on core composite samples which had been water leached. The leachate was distilled before the liquid scintillation counting was performed. Liquid scintillation counting was also used to determine the concentration of ^{79}Se. The core composite samples were digested using fusion, and the Se fraction was distilled before counting. The ^{14}C samples were prepared by the hot persulfate method and counted with a scintillation counter.

B2.5.6 $^{59}Ni/^{63}Ni$ Analysis

Analyses for ^{59}Ni and ^{63}Ni were performed on the core composite samples. One planned deviation from the procedure was approved by the cognizant scientist. The samples were plated on platinum disks rather than stainless steel to minimize the fluorescence of stable Ni by beta decay of the ^{63}Ni. Although Ni from the stainless steel is eliminated, the fluorescence still occurs because of the presence of stable Ni carrier (Pool 1994).

Comparison of the two composite samples from core 27 and their duplicates indicates a possible sample mix-up. Sample 92-10670-B1 ^{63}Ni activity looks much more like that of sample 92-10669-B1. The same applies for the duplicate samples. Whether or not the sample identifications were mixed, the conclusion should be the same: ^{63}Ni is present in the tank but is not homogeneous (Pool 1994).

B2.6 PHYSICAL ANALYSES

B2.6.1 Density and Physical Measurements

Upon extrusion, a density calculation was made for each segment from both cores by dividing the mass recovered for that segment by its volume. Because these were the only density measurements made on both cores using the same method, the mean density value from this procedure (1.25 g/mL) is being used as the overall waste density. A density was also calculated on the drainable liquid from segment 1 of core 26.

Physical testing was performed on unhomogenized material from three segments of core 26 (segments 2, 5, and 8). The testing included density and settling behavior (volume percent settled solids and volume and weight percent centrifuged solids). These tests were performed on the "as-received" material and 1:1 and 3:1 water/sample dilutions (Pool 1994). Because the waste materials in cores 26 and 27 are visually different, lateral heterogeneity is suspected, and the summaries in the table may provide a biased description of the waste's physical properties. A preferable set of measurements would include complete segment-level measurements on both cores, so that both horizontal and vertical variability could be adequately assessed (Heasler et al. 1994).

The values for the water to sample dilutions represent the potential matrix characteristics if the waste is sluiced (Heasler et al. 1994). The measured segment level densities (centrifuged) are much higher than the calculated bulk density of 1.25 g/mL. This is probably because of the different methods used rather than inhomogeneity.

The weight percent solids were determined for the segments from both cores. However, these values were determined differently for each core. For core 26, weight percent solids analyses were performed on each of the unhomogenized segments and both core composite samples according to PNL technical procedure PNL-ALO-504, "Percent Solids

Determination of Soils/Sludges/Solids" (Pool 1994). This analysis is a gravimetric determination of the weight percent solids as measured by the loss of mass in the sample after being held in a drying oven at 105 °C (221 °F) for 24 hours. For core 27, the segment weight percent solids values were derived from thermogravimetric analyses (TGA). TGA analyses are discussed in Section B2.7.1. According to Pool (1994), a comparison of the weight percent solids data by the two methods is not valid because the TGA samples had been stored in vials in the hot-cell and had lost a significant amount of moisture before being analyzed.

B2.6.2 Rheological Properties

Rheological properties measured on segments 2, 5, and 8 of core 26 included shear strength and shear stress as a function of shear rate.

Shear strength is a semiquantitative measure of the force required to move the sample. Because this property depends upon sample history, the shear strength was measured before the sample was disturbed (only on the "as-received" segments). Technical procedure PNL-ALO-501 was used to perform these measurements (Pool 1994).

Shear stress as a function of shear rate was run in duplicate at ambient temperature for each "as-received" segment material. The shear stress exceeded the maximum value of system being used for this measurement (8,500 Pa or 85,000 dynes/cm^2). The cone was being rotated at a significantly larger rate than was used for the shear strength measurement; therefore, the shear stress measured would be higher than the shear strength of the material. Some drying of the sample may also have occurred on the plate, causing the shear strength to be higher than expected. Because of sample drying at 95 °C (203 °F), the shear stress of the samples as a function of shear rate could not be measured on the "as-received" samples at this temperature.

Rheological properties were measured in duplicate on the 1:1 and 3:1 water-to-sample dilutions of segments 2, 5, and 8 at ambient temperature. A single measurement of shear stress as a function of shear rate was run at a 3:1 dilution at 95 °C. Only one measurement was made because the sample was drying too quickly to make a duplicate measurement which accurately represented the viscosity of the sample (Heasler et al. 1994). No measurement was possible on the 1:1 dilution because of drying.

The 1:1 dilution samples exhibit psuedoplastic behavior, and the data was fit to a yield power law expression. The equation to fit this data is given below. The parameters from the fit were input into a model developed by Hanks to predict the flow properties for non-Newtonian fluids. The data obtained from this model is Pacific Northwest Laboratory Quality Assurance Impact Level III (Heasler et al. 1994). The data obtained includes critical velocity for turbulent flow and critical Reynolds number.

$$\tau = \tau_y + K\gamma^n$$

where:

τ	=	shear stress
τ_y	=	yield point
K	=	consistency parameter
γ	=	shear rate
n	=	flow behavior index.

The 3:1 dilutions also exhibit yield psuedoplastic behavior with a yield point of less than 0.5 Pa. The viscosity and yield point of the samples was so low that no attempt was made to model the data. At shear rates greater than 100 s^{-1}, the viscosity of the 3:1 dilution samples was less than 5 cP. The viscosity of the 3:1 dilution decreases significantly with increasing temperature. Plots of shear stress and viscosity as a function of shear rate for the dilutions are shown in Figures B2-1, B2-2, and B2-3.

Figure B2-1. Settling Behavior of Segment 2 (Core 26).

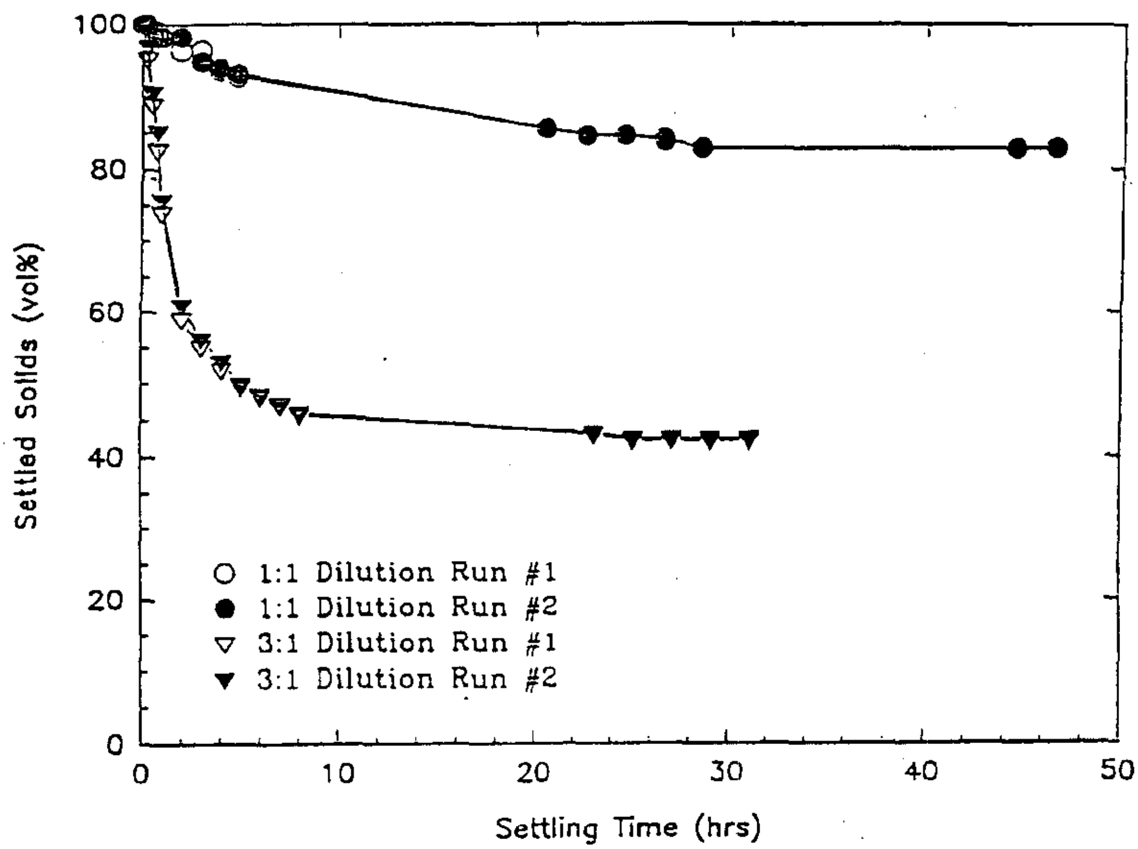


Figure B2-2. Settling Behavior of Segment 5 (Core 26).

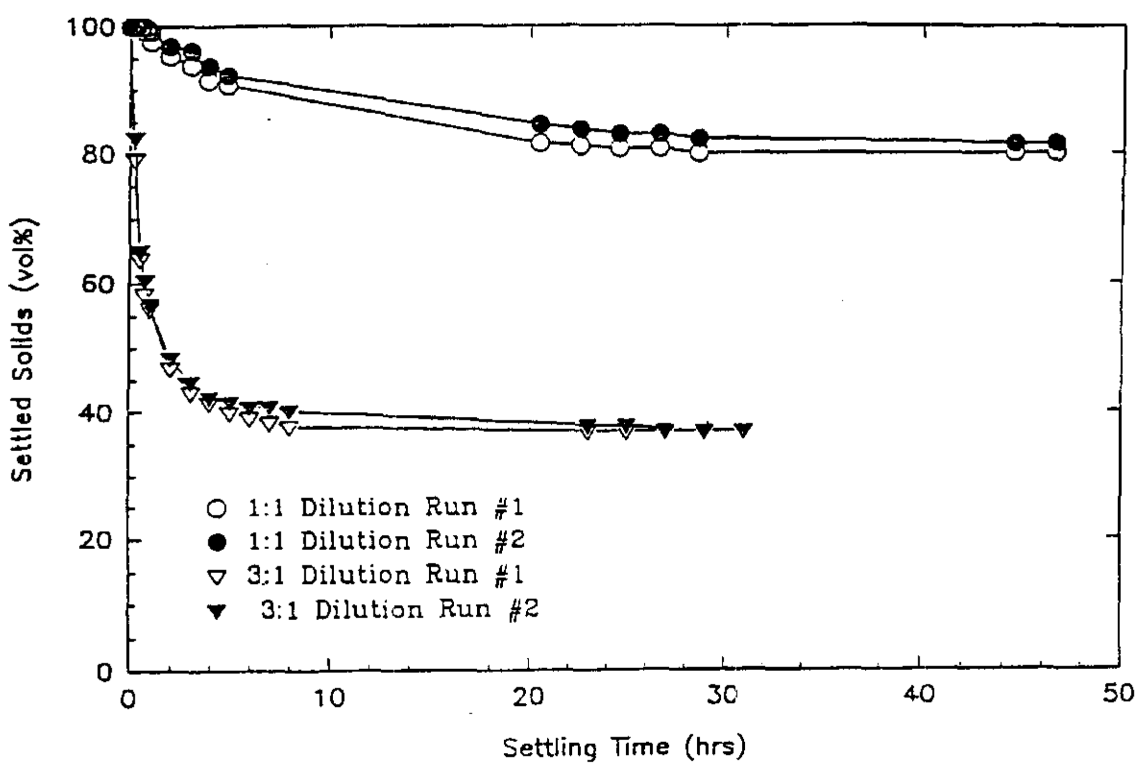
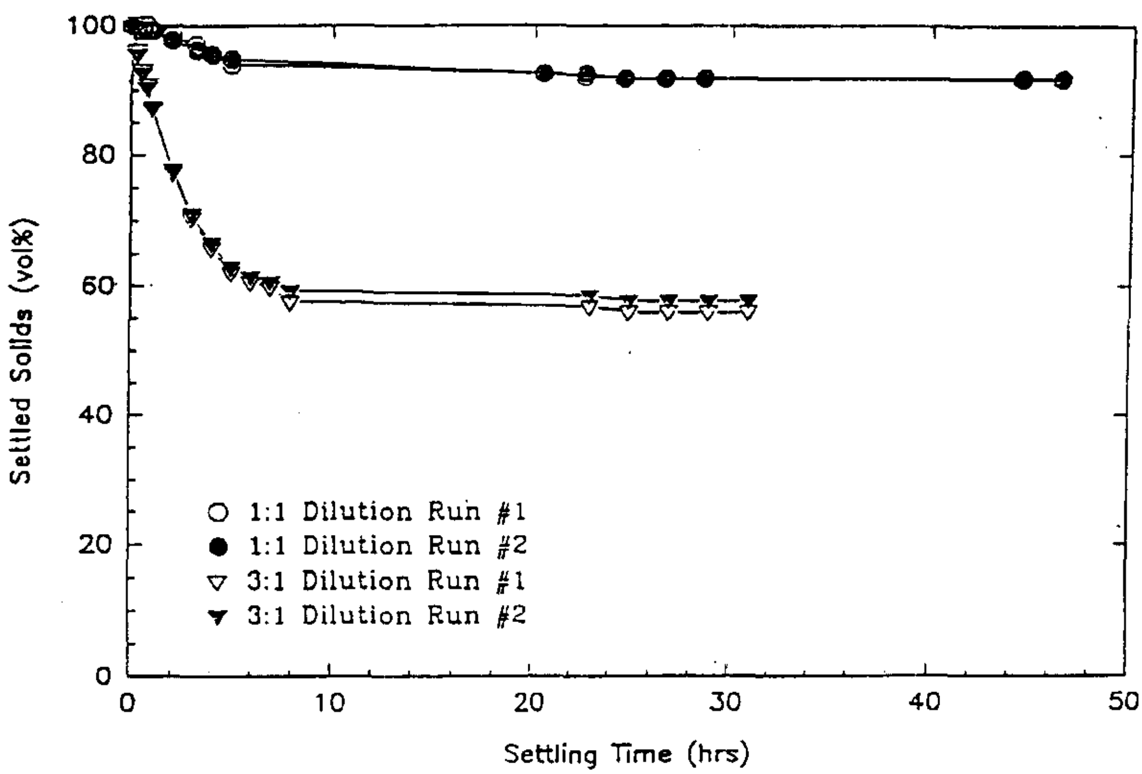


Figure B2-3. Settling Behavior of Segment 8 (Core 26).



B2.6.3 Penetration Resistance

For core 26, the penetration resistance was measured on all segments except segment 1, which did not have enough solids to make an accurate measurement. The penetration resistance measurement was made on the unhomogenized segment material before further subsampling. These measurements were made after the sample had been sealed in a bottle for approximately six months. The penetration resistance for all segments was less than three pounds per square inch; therefore, the sludge is cohesive and will be broken into pieces by the mixer pump instead of being eroded (Pool 1994).

Penetration resistance was measured on all segments from core 27. Like core 26, this measurement was made on the unhomogenized segment material before further subsampling. These measurements were made after the sample had been sealed in a bottle for approximately one year. The penetration resistance for all segments was greater than one pound per square inch, indicating that the sludge is cohesive (Pool 1994).

B2.6.4 Particle Size Analysis

The particle size distribution was measured on unhomogenized material from each segment of both cores. This analysis was performed according to PNL-ALO-530, Rev. 0. The particle size analyzer determined particle sizes from 0.5 to 150 μm by measuring the time required for a rapidly moving laser beam to traverse selected particles maintained in a stirred suspension. A glass sphere reference was measured before running the samples to ensure proper operation of the instrument (Heasler et al. 1994).

Results from the particle size analysis on core 26 show that most particles in these samples are less than 6 μm in diameter, based on the number density. The volume density data indicates a small percentage of particles of much larger size, but it appears only a few particles exceed 80 μm in diameter. Individual quantitative segment results for core 26 were not found in the data package (Pool 1994); however, distribution profiles were presented (Heasler et al. 1994). These profiles can be viewed in Pool.

The particle size distribution for core 27 shows that most particles in these samples are less than 2 μm in diameter, based on the number density. The median particle diameters based on number and volume densities are 0.91 $\pm$ 0.06 and 22.4 $\pm$ 13.2 μm, respectively. The volume density data indicates a small percentage of particles of much larger size, but it appears only a few of the particles exceed 100 μm in diameter. Distribution profiles are in the data package. No discernible trend is observed in the particle size data as a function of depth (Heasler et al. 1994).

B2.6.5 pH

The pH of the water leaches of the core 26 composite materials (100:1 dilution followed by filtration) and of 10:1 water-to-sample slurries of the core composite materials was measured according to PNL-ALO-225, "Measurement of pH in Aqueous Solutions." The average pH for the water leaches of the samples was 8.5 and 8.6 for composite samples 1 and 2, respectively. The calibration check (made after the measurement of the samples) using a pH 7 buffer was out of control. The measured pH for this calibration check was 6.5. The pH of the 10:1 slurries was 11.0 for each core composite sample. All calibrations and checks were in control during and after the analysis of the 10:1 slurry sample (Heasler et al. 1994).

The pH of the water leaches of the core 27 composite materials (100:1 dilution followed by filtration) was measured in duplicate, according to PNL-ALO-225. The pH for the water leaches of the samples was 8.5 for both composite samples 1 and 2 (Heasler et al. 1994).

B2.7 THERMODYNAMIC ANALYSES

B2.7.1 Thermogravimetric Analysis

A TGA measures the mass of a sample while the temperature of the sample is increased at a constant rate; it is used to measure thermal decomposition temperatures, water contents, and reaction temperatures. For core 26, a TGA was performed only on the core composite samples, while only the unhomogenized segments of core 27 were subjected to a TGA. Pool (1994) included a discussion of the core 26 TGA results; however, no tables were included, and only two TGA scans were found. The scans are from the primary and duplicate runs for sample 92-03254 (core 26, composite I). The TGA data for core 27 was complete in Pool (1994) except for TGA scans. Because TGA and DSC analyses complement each other and are used together in determining the thermal stability or reactivity of a material, the TGA and DSC discussions have been combined in Section B2.7.2.

B2.7.2 Differential Scanning Calorimetry

Differential scanning calorimetry measures the heat released or absorbed while the temperature of the sample is increased at a constant rate, and is often used to measure thermal decomposition temperatures, heats of reaction, reaction temperatures, melting points, and solid-solid transition temperatures. Although DSC was performed on the core 26 composite samples, the only data contained in Pool (1994) for these samples are two scans of sample 92-03254 (core 26, composite I).

The most notable observation drawn from the thermal analyses (DSC and TGA) is that no exotherms were found.

However, the thermal analyses on the core 27 segments did identify two endotherms in the waste, which together generally absorbed over 800 J/g (200 cal/g). These two endotherms occurred between the ambient temperature and 140 °C (284 °F) and between 140 and 223 °C (433 °F). These endotherms are believed the result of the loss of free and bound water (Heasler et al. 1994).

The thermal analysis for all segment materials was similar except for segment 3. As TGA data indicates, the segment 3 material has lost all of the free water before the thermal analysis. Because limited free water is present in the segment, the major transition, transition 1, is not present in the thermogram. The absence of this transition facilitates the detection of smaller transitions, and, in this sample, a third small endothermic transition was observed at much higher temperatures. A small weight loss of approximately 2 weight percent is associated with this transition. This weight loss was also observed in several additional segment samples. The third endotherm may be present in the other samples, but because the enthalpy of this endotherm is so much smaller than the water loss endotherm, it is not readily observed. Not enough data is available to determine reactions or phase transitions associated with this endothermic reaction in transition 3 (Pool 1994).

For core 26, only one endothermic transition was observed in the composite sample scans. The temperature range of the endothermic region was between ambient temperature and 125 °C (257 °F). The change in enthalpy was approximately 1,130 J/g. This transition is caused by the evaporation of water from the sample, a conclusion supported by the TGA data. Only one transition, occurring in the same temperature range as the DSC analysis, was exhibited on the TGA scans. The weight loss (or weight percent water) was 52 percent.

B2.8 ANALYTICAL DATA TABLES

For most analytes (except for some physical and rheological measurements), the data tables consist of six columns. The first column lists the sample number. Note that for each primary/duplicate pair, the sample number is for the primary result (designated as "Result"). Sample numbers for duplicates are the same as for primaries, with a different extension. For example, if a primary run has a sample number of 92-03254-A1, the duplicate would have a sample number of 92-03254-A2. The second column lists the core and/or segment from which the samples were derived. An entry of "26:3" means core 26, segment 3. The third column lists the sample portion from which the aliquots were taken. No distinction was made between composites I and II from each core. For the ICP analytes, results from both fusions have been included; no distinction has been made between the two fusion digestions. The final three columns display the primary and duplicate analytical values and a mean for each sample/duplicate pair. Because of validation issues with the data, the data validation section (see Section B3.3.4) should be consulted before using the data.

Table B2-2. Tank 241-B-201 Analytical Results: Arsenic (GFAA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03254-B1	Core 26 composite	Whole	0.4	0.3	0.35
92-03255-B1		Whole	0.2	0.7	0.45
92-10669-A1	Core 27 composite	Whole	< 0.5	< 0.5	< 0.5
92-10670-A1		Whole	< 0.5	< 0.5	< 0.5

Table B2-3. Tank 241-B-201 Analytical Results: Antimony (GFAA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03254-A1	Core 26 composite	Whole	0.3	< 0.2	< 0.25
92-03255-A1		Whole	< 0.2	< 0.2	< 0.2
92-10669-A1	Core 27 composite	Whole	< 0.6	< 0.4	< 0.5
92-10670-A1		Whole	< 0.6	< 0.6	< 0.6

Table B2-4. Tank 241-B-201 Analytical Results: Selenium (GFAA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03254-B1	Core 26 composite	Whole	< 0.6	< 0.7	< 0.65
92-03255-B1		Whole	< 0.6	< 0.7	< 0.65
92-10669-A1	Core 27 composite	Whole	< 2.4	< 2.4	< 2.4
92-10670-A1		Whole	< 2.4	< 2.4	< 2.4

Table B2-5. Tank 241-B-201 Analytical Results: Mercury (CVAA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**μg/g**	**μg/g**	**μg/g**
92-03254-D1	Core 26 composite	Whole	1.1	0.9	1
92-03255-D1		Whole	0.4	1.1	0.75
92-10669-D1	Core 27 composite	Whole	0.56	0.52	0.54
92-10670-D1		Whole	0.11	0.10	0.105

Table B2-6. Tank 241-B-201 Analytical Results: Arsenic (TCLP - ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: TCLP leachate			**mg/L**	**mg/L**	**mg/L**
92-10669-L1	Core 27 composite	Whole	< 0.08	< 0.08	< 0.08
92-10670-L1		Whole	< 0.06	---	< 0.06

Table B2-7. Tank 241-B-201 Analytical Results: Barium (TCLP - ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: TCLP leachate			**mg/L**	**mg/L**	**mg/L**
92-10669-L1	Core 27 composite	Whole	< 0.01	< 0.01	< 0.01
92-10670-L1		Whole	< 0.01	---	< 0.01

Table B2-8. Tank 241-B-201 Analytical Results: Cadmium (TCLP - ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: TCLP leachate			**mg/L**	**mg/L**	**mg/L**
92-10669-L1	Core 27 composite	Whole	0.05	0.05	0.05
92-10670-L1		Whole	0.05	---	0.05

Table B2-9. Tank 241-B-201 Analytical Results: Chromium (TCLP - ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: TCLP leachate			mg/L	mg/L	mg/L
92-10669-L1	Core 27 composite	Whole	3.4	3.3	3.35
92-10670-L1		Whole	3.4	---	3.4

Table B2-10. Tank 241-B-201 Analytical Results: Lead (TCLP - ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: TCLP leachate			mg/L	mg/L	mg/L
92-10669-L1	Core 27 composite	Whole	0.3	0.3	0.3
92-10670-L1		Whole	0.3	---	0.3

Table B2-11. Tank 241-B-201 Analytical Results: Mercury (TCLP - CVAA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: TCLP leachate			mg/L	mg/L	mg/L
92-10669-L1	Core 27 composite	Whole	0.03	0.02	0.025
92-10670-L1		Whole	0.003	0.003	0.003

Table B2-12. Tank 241-B-201 Analytical Results: Selenium (TCLP - ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: TCLP leachate			mg/L	mg/L	mg/L
92-10669-L1	Core 27 composite	Whole	< 0.08	< 0.08	< 0.08
92-10670-L1		Whole	< 0.08	---	< 0.08

Table B2-13. Tank 241-B-201 Analytical Results: Silver (TCLP - ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: TCLP leachate			mg/L	mg/L	mg/L
92-10669-L1	Core 27 composite	Whole	0.05	0.05	0.05
92-10670-L1		Whole	0.06	---	0.06

Table B2-14. Tank 241-B-201 Analytical Results: Aluminum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	3,473.3	3,433.7	3,453.5
92-03238-A		Upper 1/2	3,556	3,590.8	3,573.4
92-03241-A	26: 7	Lower 1/2	164.6	184.5	174.55
92-03240-A		Upper 1/2	171.8	151.3	161.55
91-07661-A4B	27: 3	Lower 1/2	1,247	1,263	1,255
91-07661-A4B		Lower 1/2	1,261	1,244	1,252.5
91-07661-A4T		Upper 1/2	1,218	1,262	1,240
91-07661-A4T		Upper 1/2	1,249	1,259	1,254
91-07673-A4B	27: 6	Lower 1/2	137	149	143
91-07673-A4B		Lower 1/2	178	166	172
91-07673-A4T		Upper 1/2	176	206	191
91-07673-A4T		Upper 1/2	127	175	151
92-03254-A1	Core 26 composite	Whole	5,767.2	8,594.4	7,180.8
92-03254-A1		Whole	5,591.6	8,318.1	6,954.85
92-03255-A1		Whole	4,686	4,882	4,784
92-03255-A1		Whole	4,908.1	5,009.3	4,958.7
92-10670-A1	Core 27 composite	Whole	899	831	865
92-10669-A1		Whole	894	860	877

Table B2-14. Tank 241-B-201 Analytical Results: Aluminum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	12,324.8	13,071.6	12,698.2
92-3254-H1		Whole	14,497.3	14,543.6	14,520.5
92-3255-H1		Whole	9,653.7	10,231.4	9,942.55
92-3255-H1		Whole	10,418.4	10,606.3	10,512.3
92-03251-H1B		Lower 1/2	8,421	8,175	8,298
92-03253-H1B		Lower 1/2	7,096	6,550	6,823
92-03250-HIT		Upper 1/2	6,940	7,183	7,061.5
92-03252-H1T		Upper 1/2	5,700	5,611	5,655.5
92-10669-H1	Core 27 composite	Whole	1,168	1,293	1,230.5
92-10670-H1		Whole	1,000	1,057	1,028.5
92-10669-H1B		Lower 1/2	1,071	1,531	1,301
92-10670-H1B		Lower 1/2	1,049	1,205	1,127
92-10669-H1T		Upper 1/2	1,349	1,335	1,342
92-10670-H1T		Upper 1/2	1,025	1,267	1,146
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-3254-C1	Core 26 composite	Whole	90.5	---	90.5
92-3254-C1		Whole	77.6	85	81.3
92-3255-C1		Whole	87.9	109.4	98.65
92-10669-C1	Core 27 composite	Whole	32	30	31
92-10669-C1		Whole	31	26	28.5
92-10670-C1		Whole	22	22	22
92-10670-C1		Whole	21	20	20.5

Table B2-15. Tank 241-B-201 Analytical Results: Antimony (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**μg/g**	**μg/g**	**μg/g**
92-03239-A	26: 3	Lower 1/2	< 103	< 92.7	< 97.9
92-03238-A		Upper 1/2	< 98.2	< 104	< 101
92-03241-A	26: 7	Lower 1/2	< 103	< 89.6	< 96.3
92-03240-A		Upper 1/2	< 98.9	< 87.3	< 93.1
91-07661-A4B	27: 3	Lower 1/2	< 37.7	< 39.3	< 38.5
91-07661-A4B		Lower 1/2	< 94.4	< 98.2	< 96.3
91-07661-A4T		Upper 1/2	< 38.7	< 40.3	< 39.5
91-07661-A4T		Upper 1/2	< 96.8	< 101	< 98.9
91-07673-A4B	27: 6	Lower 1/2	< 40.0	< 34.2	< 37.1
91-07673-A4B		Lower 1/2	< 100	< 85.4	< 92.7
91-07673-A4T		Upper 1/2	< 38.6	< 40.6	< 39.6
91-07673-A4T		Upper 1/2	< 96.4	< 101	< 98.7
92-03254-A1	Core 26 composite	Whole	< 10.2	< 10.2	< 10.2
92-03254-A1		Whole	< 50.8	< 50.8	< 50.8
92-03255-A1		Whole	< 10.0	< 9.29	< 9.65
92-03255-A1		Whole	< 50.2	< 46.4	< 48.3
92-10670-A1	Core 27 composite	Whole	< 47.1	< 48.3	< 47.7
92-10669-A1		Whole	< 51.6	< 32.7	< 42.2
Solids: fusion digest			**μg/g**	**μg/g**	**μg/g**
92-3254-H1	Core 26 composite	Whole	< 364	< 396	< 380
92-3254-H1		Whole	< 295	< 318	< 307
92-3255-H1		Whole	< 223	< 236	< 230
92-3255-H1		Whole	< 225	< 207	< 216
92-03251-H1B		Lower 1/2	< 202	< 192	< 197
92-03253-H1B		Lower 1/2	< 193	< 202	< 198
92-03250-HIT		Upper 1/2	< 187	< 199	< 193
92-03252-H1T		Upper 1/2	< 202	< 212	< 207
92-10669-H1	Core 27 composite	Whole	< 220	< 223	< 222
92-10670-H1		Whole	< 211	< 222	< 217
92-10669-H1B		Lower 1/2	< 209	< 215	< 212
92-10670-H1B		Lower 1/2	< 220	< 217	< 219
92-10669-H1T		Upper 1/2	< 217	< 199	< 208
92-10670-H1T		Upper 1/2	< 217	< 220	< 219

Table B2-15. Tank 241-B-201 Analytical Results: Antimony (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			μg/g	μg/g	μg/g
92-3254-C1	Core 26 composite	Whole	< 24.8	---	< 24.8
92-3254-C1		Whole	< 4.96	< 5.23	< 5.10
92-3255-C1		Whole	< 4.94	< 5.09	< 5.02
92-10669-C1	Core 27 composite	Whole	< 5.04	< 5.06	< 5.05
92-10669-C1		Whole	< 10.1	< 10.1	< 10.1
92-10670-C1		Whole	< 4.85	< 4.91	< 4.88
92-10670-C1		Whole	< 9.69	< 9.82	< 9.76

Table B2-16. Tank 241-B-201 Analytical Results: Arsenic (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-03239-A	26: 3	Lower 1/2	< 164	< 148	< 156
92-03238-A		Upper 1/2	< 157	< 167	< 162
92-03241-A	26: 7	Lower 1/2	< 165	< 143	< 154
92-03240-A		Upper 1/2	< 158	< 140	< 149
91-07661-A4B	27: 3	Lower 1/2	< 60.4	< 62.8	< 61.6
91-07661-A4B		Lower 1/2	< 151	< 157	< 154
91-07661-A4T		Upper 1/2	< 61.9	< 64.5	< 63.2
91-07661-A4T		Upper 1/2	< 155	< 161	< 158
91-07673-A4B	27: 6	Lower 1/2	< 64.0	< 54.7	< 59.4
91-07673-A4B		Lower 1/2	< 160	< 137	< 149
91-07673-A4T		Upper 1/2	< 61.7	< 64.9	< 63.3
91-07673-A4T		Upper 1/2	< 154	< 162	< 158
92-03254-A1	Core 26 composite	Whole	16.8	< 16.3	< 16.6
92-03254-A1		Whole	< 81.2	< 81.3	< 81.3
92-03255-A1		Whole	< 16.1	< 14.9	< 15.5
92-03255-A1		Whole	< 80.4	< 74.3	<77.4
92-10670-A1	Core 27 composite	Whole	< 75.3	< 77.2	< 76.3
92-10669-A1		Whole	< 82.6	< 52.3	< 67.5
Solids: fusion digest			μg/g	μg/g	μg/g
92-3254-H1	Core 26 composite	Whole	721.6	715.3	718.45
92-3254-H1		Whole	498.4	636.7	567.55
92-3255-H1		Whole	388.3	< 377	< 383
92-3255-H1		Whole	447.9	446.1	447
92-03251-H1B		Lower 1/2	< 323	< 307	< 315
92-03253-H1B		Lower 1/2	< 309	< 324	< 317
92-03250-HIT		Upper 1/2	< 299	< 318	< 309
92-03252-H1T		Upper 1/2	< 323	< 338	< 331
92-10669-H1	Core 27 composite	Whole	< 353	< 357	< 355
92-10670-H1		Whole	< 337	< 355	< 346
92-10669-H1B		Lower 1/2	< 334	< 343	< 339
92-10670-H1B		Lower 1/2	< 352	< 347	< 350
92-10669-H1T		Upper 1/2	< 347	< 318	< 333
92-10670-H1T		Upper 1/2	< 347	< 352	< 350

Table B2-16. Tank 241-B-201 Analytical Results: Arsenic (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 39.7	---	< 39.7
92-3254-C1		Whole	< 7.94	< 8.36	< 8.15
92-3255-C1		Whole	< 7.90	< 8.14	< 8.02
92-10669-C1	Core 27 composite	Whole	< 8.06	< 8.09	< 8.08
92-10669-C1		Whole	< 16.1	< 16.2	< 16.2
92-10670-C1		Whole	< 7.75	< 7.86	< 7.81
92-10670-C1		Whole	< 15.5	< 15.7	< 15.6

Table B2-17. Tank 241-B-201 Analytical Results: Barium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	74.2	71	72.6
92-03238-A		Upper 1/2	73.5	80.6	77.05
92-03241-A	26: 7	Lower 1/2	63.1	62	62.55
92-03240-A		Upper 1/2	61.5	48.3	54.9
91-07661-A4B	27: 3	Lower 1/2	48	54	51
91-07661-A4B		Lower 1/2	48	53	50.5
91-07661-A4T		Upper 1/2	50	52	51
91-07661-A4T		Upper 1/2	51	52	51.5
91-07673-A4B	27: 6	Lower 1/2	62	58	60
91-07673-A4B		Lower 1/2	62	59	60.5
91-07673-A4T		Upper 1/2	62	60	61
91-07673-A4T		Upper 1/2	62	61	61.5
92-03254-A1	Core 26 composite	Whole	126.9	140.4	133.65
92-03254-A1		Whole	124.5	138.3	131.4
92-03255-A1		Whole	105	109.2	107.1
92-03255-A1		Whole	102.2	108.3	105.25
92-10670-A1	Core 27 composite	Whole	58	53	55.5
92-10669-A1		Whole	55	49	52

Table B2-17. Tank 241-B-201 Analytical Results: Barium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	1,811	2,069.3	1,940.15
92-3254-H1		Whole	2,279.8	2,542.4	2,411.1
92-3255-H1		Whole	1,518.4	1,527.4	1,522.9
92-3255-H1		Whole	1,466.8	1,500.5	1,483.65
92-03251-H1B		Lower 1/2	441	265	353
92-03253-H1B		Lower 1/2	247	175	211
92-03250-HIT		Upper 1/2	243	223	233
92-03252-H1T		Upper 1/2	164	144	154
92-10669-H1	Core 27 composite	Whole	68	73	70.5
92-10670-H1		Whole	64	69	66.5
92-10669-H1B		Lower 1/2	56	58	57
92-10670-H1B		Lower 1/2	54	61	57.5
92-10669-H1T		Upper 1/2	60	69	64.5
92-10670-H1T		Upper 1/2	56	62	59
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 4.96	---	< 4.96
92-3254-C1		Whole	< 0.992	< 1.05	< 1.02
92-3255-C1		Whole	< 0.988	< 1.02	< 1.00
92-10669-C1	Core 27 composite	Whole	< 1.01	< 1.01	< 1.01
92-10669-C1		Whole	< 2.01	< 2.02	< 2.02
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95

Table B2-18. Tank 241-B-201 Analytical Results: Beryllium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 10.3	< 9.27	< 9.79
92-03238-A		Upper 1/2	< 9.82	< 10.4	< 10.1
92-03241-A	26: 7	Lower 1/2	< 10.3	< 8.96	< 9.63
92-03240-A		Upper 1/2	< 9.89	< 8.73	< 9.31
91-07661-A4B	27: 3	Lower 1/2	< 3.77	< 3.93	< 3.85
91-07661-A4B		Lower 1/2	< 9.44	< 9.82	< 9.63
91-07661-A4T		Upper 1/2	< 3.87	< 4.03	< 3.95
91-07661-A4T		Upper 1/2	< 9.68	< 10.1	< 9.89
91-07673-A4B	27: 6	Lower 1/2	< 4.00	< 3.42	< 3.71
91-07673-A4B		Lower 1/2	< 10.0	< 8.54	< 9.27
91-07673-A4T		Upper 1/2	< 3.86	< 4.06	< 3.96
91-07673-A4T		Upper 1/2	< 9.64	< 10.1	< 9.87
92-03254-A1	Core 26 composite	Whole	< 1.02	< 1.02	< 1.02
92-03254-A1		Whole	< 5.08	< 5.08	< 5.08
92-03255-A1		Whole	< 1.00	< 0.929	< 0.965
92-03255-A1		Whole	< 5.02	< 4.64	< 4.83
92-10670-A1	Core 27 composite	Whole	< 4.71	< 4.83	< 4.77
92-10669-A1		Whole	< 5.16	< 3.27	< 4.22
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 36.4	< 39.6	< 38.0
92-3254-H1		Whole	< 29.5	< 31.8	< 30.7
92-3255-H1		Whole	< 22.5	< 20.7	< 21.6
92-3255-H1		Whole	< 22.3	< 23.6	< 23.0
92-03251-H1B		Lower 1/2	< 20.2	< 19.2	< 19.7
92-03253-H1B		Lower 1/2	< 19.3	< 20.2	< 19.8
92-03250-HIT		Upper 1/2	< 18.7	< 19.9	< 19.3
92-03252-H1T		Upper 1/2	< 20.2	< 21.2	< 20.7
92-10669-H1	Core 27 composite	Whole	< 22.0	< 22.3	< 22.2
92-10670-H1		Whole	< 21.1	< 22.2	< 21.7
92-10669-H1B		Lower 1/2	< 20.9	< 21.5	< 21.2
92-10670-H1B		Lower 1/2	< 22.0	< 21.7	< 21.9
92-10669-H1T		Upper 1/2	< 21.7	< 19.9	< 20.8
92-10670-H1T		Upper 1/2	< 21.7	< 22.0	< 21.9

Table B2-18. Tank 241-B-201 Analytical Results: Beryllium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			μg/g	μg/g	μg/g
92-3254-C1	Core 26 composite	Whole	< 2.48	---	< 2.48
92-3254-C1		Whole	< 0.496	< 0.523	< 0.510
92-3255-C1		Whole	< 0.494	< 0.509	< 0.502
92-10669-C1	Core 27 composite	Whole	< 0.504	< 0.506	< 0.505
92-10669-C1		Whole	< 1.01	< 1.01	< 1.01
92-10670-C1		Whole	< 0.485	< 0.491	< 0.488
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976

Table B2-19. Tank 241-B-201 Analytical Results: Bismuth (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-03239-A	26: 3	Lower 1/2	63,797.9	58,593.5	61,195.7
92-03238-A		Upper 1/2	63,929.3	72,380	68,154.6
92-03241-A	26: 7	Lower 1/2	1.172E+05	1.219E+05	1.196E+05
92-03240-A		Upper 1/2	1.103E+05	89,057.6	99,659.3
91-07661-A4B	27: 3	Lower 1/2	62,012	66,392	64,202
91-07661-A4B		Lower 1/2	62,597	66,254	64,425.5
91-07661-A4T		Upper 1/2	65,031	67,336	66,183.5
91-07661-A4T		Upper 1/2	65,886	67,877	66,881.5
91-07673-A4B	27: 6	Lower 1/2	1.314E+05	1.258E+05	1.286E+05
91-07673-A4B		Lower 1/2	1.294E+05	1.273E+05	1.284E+05
91-07673-A4T		Upper 1/2	1.231E+05	1.212E+05	1.221E+05
91-07673-A4T		Upper 1/2	1.251E+05	1.224E+05	1.237E+05
92-03254-A1	Core 26 composite	Whole	1.311E+05	90,828.8	1.110E+05
92-03254-A1		Whole	1.456E+05	94,698.4	1.202E+05
92-03255-A1		Whole	1.093E+05	1.053E+05	1.073E+05
92-03255-A1		Whole	1.149E+05	1.143E+05	1.146E+05
92-10670-A1	Core 27 composite	Whole	93,115	89,249	91,182
92-10669-A1		Whole	91,257	82,244	86,750.5

Table B2-19. Tank 241-B-201 Analytical Results: Bismuth (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	92,692.7	97,326.5	95,009.6
92-3254-H1		Whole	97,915.4	1.054E+05	1.016E+05
92-3255-H1		Whole	84,955.3	89,008.2	86,981.8
92-3255-H1		Whole	97,027.3	96,747.5	96,887.4
92-03251-H1B		Lower 1/2	97,091	1.002E+05	98,623
92-03253-H1B		Lower 1/2	1.051E+05	78,532	91,815.5
92-03250-HIT		Upper 1/2	1.022E+05	1.090E+05	1.056E+05
92-03252-H1T		Upper 1/2	91,964	93,170	92,567
92-10669-H1	Core 27 composite	Whole	96,060	1.004E+05	98,251
92-10670-H1		Whole	91,000	94,867	92,933.5
92-10669-H1B		Lower 1/2	85,675	89,513	87,594
92-10670-H1B		Lower 1/2	85,766	90,414	88,090
92-10669-H1T		Upper 1/2	82,650	1.027E+05	92,669.5
92-10670-H1T		Upper 1/2	88,226	96,207	92,216.5
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 49.6	---	< 49.6
92-3254-C1		Whole	12.2	11.4	11.8
92-3255-C1		Whole	< 9.88	< 10.2	< 10.0
92-10669-C1	Core 27 composite	Whole	20	< 20.2	20.1
92-10669-C1		Whole	18	13	15.5
92-10670-C1		Whole	13	14	13.5

Table B2-20. Tank 241-B-201 Analytical Results: Boron (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	579.6	482.3	530.95
92-03238-A		Upper 1/2	583.7	693.3	638.5
92-03241-A	26: 7	Lower 1/2	689.8	627.9	658.85
92-03240-A		Upper 1/2	540.1	472.4	506.25
91-07661-A4B	27: 3	Lower 1/2	14,365	14,937	14,651
91-07661-A4B		Lower 1/2	14,357	15,084	14,720.5
91-07661-A4T		Upper 1/2	14,311	15,229	14,770
91-07661-A4T		Upper 1/2	14,485	15,237	14,861
91-07673-A4B	27: 6	Lower 1/2	101	88	94.5
91-07673-A4B		Lower 1/2	115	103	109
91-07673-A4T		Upper 1/2	123	170	146.5
91-07673-A4T		Upper 1/2	104	153	128.5
92-03254-A1	Core 26 composite	Whole	41.2	38.1	39.65
92-03254-A1		Whole	41.2	38.1	39.65
92-03255-A1		Whole	38.8	65.3	52.05
92-03255-A1		Whole	40.8	65.3	53.05
92-10670-A1	Core 27 composite	Whole	112	74	93
92-10669-A1		Whole	106	94	100
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	14,946.5	16,567.2	15,756.9
92-3254-H1		Whole	19,011.8	21,617.6	20,314.7
92-3255-H1		Whole	11,254	13,033.8	12,143.9
92-3255-H1		Whole	12,160.7	12,042.7	12,101.7
92-03251-H1B		Lower 1/2	89	< 76.7	82.9
92-03253-H1B		Lower 1/2	246	< 80.9	163
92-03250-HIT		Upper 1/2	< 74.8	< 79.5	< 77.2
92-03252-H1T		Upper 1/2	< 80.7	< 84.6	< 82.7
92-10669-H1	Core 27 composite	Whole	< 88.1	< 89.2	< 88.7
92-10670-H1		Whole	< 84.3	< 88.7	< 86.5
92-10669-H1B		Lower 1/2	< 83.5	< 85.9	< 84.7
92-10670-H1B		Lower 1/2	< 87.9	< 86.8	< 87.4
92-10669-H1T		Upper 1/2	< 86.9	< 79.5	< 83.2
92-10670-H1T		Upper 1/2	< 86.7	< 88.1	< 87.4

Table B2-20. Tank 241-B-201 Analytical Results: Boron (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 9.92	---	< 9.92
92-3254-C1		Whole	< 1.98	< 2.09	< 2.04
92-3255-C1		Whole	< 1.98	< 2.04	< 2.01
92-10669-C1	Core 27 composite	Whole	< 4.03	< 4.04	< 4.04
92-10669-C1		Whole	3	3	3
92-10670-C1		Whole	12	12	12
92-10670-C1		Whole	13	12	12.5

Table B2-21. Tank 241-B-201 Analytical Results: Cadmium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 10.3	< 9.27	< 9.79
92-03238-A		Upper 1/2	< 9.82	< 10.4	< 10.1
92-03241-A	26: 7	Lower 1/2	< 10.3	< 8.96	< 9.63
92-03240-A		Upper 1/2	< 9.89	< 8.73	< 9.31
91-07661-A4B	27: 3	Lower 1/2	< 3.77	< 3.93	< 3.85
91-07661-A4B		Lower 1/2	< 9.44	< 9.82	< 9.63
91-07661-A4T		Upper 1/2	< 3.87	< 4.03	< 3.95
91-07661-A4T		Upper 1/2	< 9.68	< 10.1	< 9.89
91-07673-A4B	27: 6	Lower 1/2	< 4.00	< 3.42	< 3.71
91-07673-A4B		Lower 1/2	< 10.0	< 8.54	< 9.27
91-07673-A4T		Upper 1/2	< 3.86	< 4.06	< 3.96
91-07673-A4T		Upper 1/2	< 9.64	< 10.1	< 9.87
92-03254-A1	Core 26 composite	Whole	5.4	< 5.08	5.2
92-03254-A1		Whole	5.3	5.4	5.35
92-03255-A1		Whole	3.4	3.8	3.6
92-03255-A1		Whole	< 5.02	< 4.64	< 4.83
92-10670-A1	Core 27 composite	Whole	< 4.71	< 4.83	< 4.77
92-10669-A1		Whole	< 5.16	< 3.27	< 4.22

Table B2-21. Tank 241-B-201 Analytical Results: Cadmium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 36.4	< 39.6	< 38.0
92-3254-H1		Whole	141.4	109.5	125.45
92-3255-H1		Whole	24.5	23.6	24.05
92-3255-H1		Whole	48.1	35.3	41.7
92-03251-H1B		Lower 1/2	< 20.2	< 19.2	< 19.7
92-03253-H1B		Lower 1/2	< 19.3	< 20.2	< 19.8
92-03250-HIT		Upper 1/2	< 18.7	< 19.9	< 19.3
92-03252-H1T		Upper 1/2	< 20.2	< 21.2	< 20.7
92-10669-H1	Core 27 composite	Whole	< 22.0	< 22.3	< 22.2
92-10670-H1		Whole	< 21.1	< 22.2	< 21.7
92-10669-H1B		Lower 1/2	< 20.9	< 21.5	< 21.2
92-10670-H1B		Lower 1/2	< 22.0	< 21.7	< 21.9
92-10669-H1T		Upper 1/2	< 21.7	< 19.9	< 20.8
92-10670-H1T		Upper 1/2	< 21.7	< 22.0	< 21.9
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-3254-C1	Core 26 composite	Whole	< 2.48	---	< 2.48
92-3254-C1		Whole	< 0.496	< 0.523	< 0.510
92-3255-C1		Whole	< 0.494	< 0.509	< 0.502
92-10669-C1	Core 27 composite	Whole	< 0.504	< 0.506	< 0.505
92-10669-C1		Whole	< 1.01	< 1.01	< 1.01
92-10670-C1		Whole	< 0.485	< 0.491	< 0.488
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976

Table B2-22. Tank 241-B-201 Analytical Results: Calcium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	13,379.9	12,897.2	13,138.5
92-03238-A		Upper 1/2	13,117.9	13,837.2	13,477.5
92-03241-A	26: 7	Lower 1/2	1,323.7	1,289.6	1,306.65
92-03240-A		Upper 1/2	1,390.7	968.6	1,179.65
91-07661-A4B	27: 3	Lower 1/2	8,683	9,007	8,845
91-07661-A4B		Lower 1/2	8,590	8,983	8,786.5
91-07661-A4T		Upper 1/2	9,060	9,302	9,181
91-07661-A4T		Upper 1/2	8,854	9,187	9,020.5
91-07673-A4B	27: 6	Lower 1/2	2,051	1,936	1,993.5
91-07673-A4B		Lower 1/2	2,098	1,977	2,037.5
91-07673-A4T		Upper 1/2	1,978	2,027	2,002.5
91-07673-A4T		Upper 1/2	1,957	1,992	1,974.5
92-03254-A1	Core 26 composite	Whole	19,368.3	24,720.7	22,044.5
92-03254-A1		Whole	20,188.9	25,817.6	23,003.2
92-03255-A1		Whole	15,340.1	15,725.4	15,532.8
92-03255-A1		Whole	16,226.3	16,254.9	16,240.6
92-10670-A1	Core 27 composite	Whole	5,242	5,101	5,171.5
92-10669-A1		Whole	5,318	4,718	5,018
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	20,207.6	20,674	20,440.8
92-3254-H1		Whole	22,652.6	22,282.2	22,467.4
92-3255-H1		Whole	17,179	19,656.1	18,417.5
92-3255-H1		Whole	17,328	18,017.4	17,672.7
92-03251-H1B		Lower 1/2	22,543	21,810	22,176.5
92-03253-H1B		Lower 1/2	18,533	17,903	18,218
92-03250-HIT		Upper 1/2	19,055	19,537	19,296
92-03252-H1T		Upper 1/2	15,543	15,482	15,512.5
92-10669-H1	Core 27 composite	Whole	5,270	5,399	5,334.5
92-10670-H1		Whole	4,870	4,979	4,924.5
92-10669-H1B		Lower 1/2	4,872	5,251	5,061.5
92-10670-H1B		Lower 1/2	4,743	5,178	4,960.5
92-10669-H1T		Upper 1/2	4,821	5,846	5,333.5
92-10670-H1T		Upper 1/2	4,461	5,147	4,804

Table B2-22. Tank 241-B-201 Analytical Results: Calcium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	40	---	40
92-3254-C1		Whole	22.2	23.2	22.7
92-3255-C1		Whole	130.5	149.3	139.9
92-10669-C1	Core 27 composite	Whole	15	12	13.5
92-10669-C1		Whole	25	18	21.5
92-10670-C1		Whole	17	12	14.5
92-10670-C1		Whole	22	17	19.5

Table B2-23. Tank 241-B-201 Analytical Results: Cerium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower ½	< 164	< 148	< 156
92-03238-A		Upper 1/2	< 157	< 167	< 162
92-03241-A	26: 7	Lower 1/2	< 165	< 143	< 154
92-03240-A		Upper 1/2	< 158	< 140	< 149
91-07661-A4B	27: 3	Lower 1/2	< 60.4	< 62.8	< 61.6
91-07661-A4B		Lower 1/2	< 151	< 157	< 154
91-07661-A4T		Upper 1/2	< 61.9	< 64.5	< 63.2
91-07661-A4T		Upper 1/2	< 155	< 161	< 158
91-07673-A4B	27: 6	Lower 1/2	< 64.0	< 54.7	< 59.4
91-07673-A4B		Lower 1/2	< 160	< 137	< 149
91-07673-A4T		Upper 1/2	< 61.7	< 64.9	< 63.3
91-07673-A4T		Upper 1/2	< 154	< 162	< 158
92-03254-A1	Core 26 composite	Whole	< 81.2	< 81.3	< 81.3
92-03254-A1		Whole	54.8	39.4	47.1
92-03255-A1		Whole	40.6	46.8	43.7
92-03255-A1		Whole	< 80.4	< 74.3	< 77.4
92-10670-A1	Core 27 composite	Whole	< 75.3	< 77.2	< 76.3
92-10669-A1		Whole	< 82.6	< 52.3	< 67.5

Table B2-23. Tank 241-B-201 Analytical Results: Cerium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 583	< 633	< 608
92-3254-H1		Whole	< 471	< 509	< 490
92-3255-H1		Whole	< 356	< 377	< 367
92-3255-H1		Whole	< 359	< 332	< 346
92-03251-H1B		Lower 1/2	< 323	< 307	< 315
92-03253-H1B		Lower 1/2	< 309	< 324	< 317
92-03250-HIT		Upper 1/2	< 299	< 318	< 309
92-03252-H1T		Upper 1/2	< 323	< 338	< 331
92-10669-H1	Core 27 composite	Whole	< 353	< 357	< 355
92-10670-H1		Whole	< 337	< 355	< 346
92-10669-H1B		Lower 1/2	< 334	< 343	< 339
92-10670-H1B		Lower 1/2	< 352	< 347	< 350
92-10669-H1T		Upper 1/2	< 347	< 318	< 333
92-10670-H1T		Upper 1/2	< 347	< 352	< 350
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-3254-C1	Core 26 composite	Whole	< 39.7	---	< 39.7
92-3254-C1		Whole	< 7.94	< 8.36	< 8.15
92-3255-C1		Whole	< 7.90	< 8.14	< 8.02
92-10669-C1	Core 27 composite	Whole	< 8.06	< 8.09	< 8.08
92-10669-C1		Whole	< 16.1	< 16.2	< 16.2
92-10670-C1		Whole	< 7.75	< 7.86	< 7.81
92-10670-C1		Whole	< 15.5	< 15.7	< 15.6

Table B2-24. Tank 241-B-201 Analytical Results: Chromium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	2,218.3	2,132.9	2,175.6
92-03238-A		Upper 1/2	2,235.8	2,507.3	2,371.55
92-03241-A	26: 7	Lower 1/2	3,330.9	3,397.6	3,364.25
92-03240-A		Upper 1/2	3,281.9	2,666.7	2,974.3
91-07661-A4B	27: 3	Lower 1/2	2,426	2,587	2,506.5
91-07661-A4B		Lower 1/2	2,448	2,595	2,521.5
91-07661-A4T		Upper 1/2	2,528	2,626	2,577
91-07661-A4T		Upper 1/2	2,579	2,668	2,623.5
91-07673-A4B	27: 6	Lower 1/2	5,401	5,146	5,273.5
91-07673-A4B		Lower 1/2	5,432	5,309	5,370.5
91-07673-A4T		Upper 1/2	5,091	5,042	5,066.5
91-07673-A4T		Upper 1/2	5,089	5,014	5,051.5
92-03254-A1	Core 26 composite	Whole	3,948.4	3,114	3,531.2
92-03254-A1		Whole	4,008.3	3,202.3	3,605.3
92-03255-A1		Whole	3,331.7	3,338.3	3,335
92-03255-A1		Whole	3,467.3	3,382.9	3,425.1
92-10670-A1	Core 27 composite	Whole	3,410	3,214	3,312
92-10669-A1		Whole	3,266	2,984	3,125
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	3,247.3	3,314.1	3,280.7
92-3254-H1		Whole	2,953.4	3,070.1	3,011.75
92-3255-H1		Whole	3,069.8	3,172.2	3,121
92-3255-H1		Whole	2,873.5	2,940.4	2,906.95
92-03251-H1B		Lower 1/2	3,342	3,396	3,369
92-03253-H1B		Lower 1/2	3,430	2,827	3,128.5
92-03250-HIT		Upper 1/2	3,405	3,567	3,486
92-03252-H1T		Upper 1/2	3,032	3,038	3,035
92-10669-H1	Core 27 composite	Whole	3,476	3,875	3,675.5
92-10670-H1		Whole	3,558	3,763	3,660.5
92-10669-H1B		Lower 1/2	3,219	3,375	3,297
92-10670-H1B		Lower 1/2	3,266	3,479	3,372.5
92-10669-H1T		Upper 1/2	3,237	3,853	3,545
92-10670-H1T		Upper 1/2	3,343	3,567	3,455

Table B2-24. Tank 241-B-201 Analytical Results: Chromium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	754.6	---	754.6
92-3254-C1		Whole	771.8	834.1	802.95
92-3255-C1		Whole	832.2	985.2	908.7
92-10669-C1	Core 27 composite	Whole	903	851	877
92-10669-C1		Whole	915	869	892
92-10670-C1		Whole	856	854	855
92-10670-C1		Whole	868	864	866

Table B2-25. Tank 241-B-201 Analytical Results: Cobalt (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower ½	< 20.5	< 18.5	< 19.5
92-03238-A		Upper 1/2	< 19.6	< 20.9	< 20.3
92-03241-A	26: 7	Lower 1/2	< 20.7	< 17.9	< 19.3
92-03240-A		Upper 1/2	< 19.8	< 17.5	< 18.7
91-07661-A4B	27: 3	Lower 1/2	< 7.55	< 7.85	< 7.70
91-07661-A4B		Lower 1/2	< 18.9	< 19.6	< 19.3
91-07661-A4T		Upper 1/2	< 7.74	< 8.07	< 7.91
91-07661-A4T		Upper 1/2	< 19.4	< 20.2	< 19.8
91-07673-A4B	27: 6	Lower 1/2	< 8.00	< 6.84	< 7.42
91-07673-A4B		Lower 1/2	< 2.00	< 17.1	< 18.6
91-07673-A4T		Upper 1/2	< 7.71	< 8.12	< 7.92
91-07673-A4T		Upper 1/2	< 19.3	< 20.3	< 19.8
92-03254-A1	Core 26 composite	Whole	10.1	9.1	9.6
92-03254-A1		Whole	10.3	< 10.2	10.3
92-03255-A1		Whole	7.9	8.9	8.4
92-03255-A1		Whole	< 10.0	< 9.29	< 9.65
92-10670-A1	Core 27 composite	Whole	< 9.42	< 9.65	< 9.54
92-10669-A1		Whole	< 10.3	< 6.54	< 8.42

Table B2-25. Tank 241-B-201 Analytical Results: Cobalt (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			μg/g	μg/g	μg/g
92-3254-H1	Core 26 composite	Whole	< 72.8	< 79.1	< 76.0
92-3254-H1		Whole	< 58.9	< 63.7	< 61.3
92-3255-H1		Whole	< 44.5	< 47.2	< 45.9
92-3255-H1		Whole	< 44.9	< 41.5	< 43.2
92-03251-H1B		Lower 1/2	63	79	71
92-03253-H1B		Lower 1/2	< 38.7	48	43.4
92-03250-HIT		Upper 1/2	71	85	78
92-03252-H1T		Upper 1/2	47	< 42.3	44.7
92-10669-H1	Core 27 composite	Whole	< 44.1	74	59.1
92-10670-H1		Whole	49	54	51.5
92-10669-H1B		Lower 1/2	< 41.8	< 42.9	< 42.4
92-10670-H1B		Lower 1/2	< 44.0	< 43.4	< 43.7
92-10669-H1T		Upper 1/2	< 43.4	< 39.7	< 41.6
92-10670-H1T		Upper 1/2	< 43.4	< 44.0	< 43.7
Solids: water digest			μg/g	μg/g	μg/g
92-3254-C1	Core 26 composite	Whole	< 4.96	---	< 4.96
92-3254-C1		Whole	< 0.992	< 1.05	< 1.02
92-3255-C1		Whole	< 0.988	< 1.02	< 1.00
92-10669-C1	Core 27 composite	Whole	< 1.01	< 1.01	< 1.01
92-10669-C1		Whole	< 2.01	< 2.02	< 2.02
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95

Table B2-26. Tank 241-B-201 Analytical Results: Copper (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	54.4	54.3	54.35
92-03238-A		Upper 1/2	55	59.5	57.25
92-03241-A	26: 7	Lower 1/2	< 10.3	< 8.96	< 9.63
92-03240-A		Upper 1/2	11.9	< 8.73	10.3
91-07661-A4B	27: 3	Lower 1/2	24	25	24.5
91-07661-A4B		Lower 1/2	26	27	26.5
91-07661-A4T		Upper 1/2	30	30	30
91-07661-A4T		Upper 1/2	29	30	29.5
91-07673-A4B	27: 6	Lower 1/2	7	8	7.5
91-07673-A4B		Lower 1/2	< 10.0	< 8.54	< 9.27
91-07673-A4T		Upper 1/2	< 9.64	< 10.1	< 9.87
91-07673-A4T		Upper 1/2	8	7	7.5
92-03254-A1	Core 26 composite	Whole	75.8	93.2	84.5
92-03254-A1		Whole	68.4	85.5	76.95
92-03255-A1		Whole	53.9	98.6	76.25
92-03255-A1		Whole	60.2	106.7	83.45
92-10670-A1	Core 27 composite	Whole	16	14	15
92-10669-A1		Whole	15	14	14.5
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	157.3	153.5	155.4
92-3254-H1		Whole	150.2	358.5	254.35
92-3255-H1		Whole	161.6	134	147.8
92-3255-H1		Whole	136.1	118.7	127.4
92-03251-H1B		Lower 1/2	114	129	121.5
92-03253-H1B		Lower 1/2	138	119	128.5
92-03250-HIT		Upper 1/2	189	134	161.5
92-03252-H1T		Upper 1/2	190	156	173
92-10669-H1	Core 27 composite	Whole	55	36	45.5
92-10670-H1		Whole	35	45	40
92-10669-H1B		Lower 1/2	69	55	62
92-10670-H1B		Lower 1/2	43	128	85.5
92-10669-H1T		Upper 1/2	99	62	80.5
92-10670-H1T		Upper 1/2	153	141	147

Table B2-26. Tank 241-B-201 Analytical Results: Copper (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 2.48	---	< 2.48
92-3254-C1		Whole	< 0.496	< 0.523	< 0.510
92-3255-C1		Whole	< 0.494	< 0.509	< 0.502
92-10669-C1	Core 27 composite	Whole	< 0.504	< 0.506	< 0.505
92-10669-C1		Whole	< 1.01	< 1.01	< 1.01
92-10670-C1		Whole	< 0.485	< 0.491	< 0.488
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976

Table B2-27. Tank 241-B-201 Analytical Results: Dysprosium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 41.1	< 37.1	< 39.1
92-03238-A		Upper 1/2	< 39.3	< 41.8	< 40.6
92-03241-A	26: 7	Lower 1/2	< 41.4	< 35.9	< 38.7
92-03240-A		Upper 1/2	< 39.5	< 34.9	< 37.2
91-07661-A4B	27: 3	Lower 1/2	< 15.1	< 15.7	< 15.4
91-07661-A4B		Lower 1/2	< 37.7	< 39.3	< 38.5
91-07661-A4T		Upper 1/2	< 15.5	< 16.1	< 15.8
91-07661-A4T		Upper 1/2	< 38.7	< 40.3	< 40.0
91-07673-A4B	27: 6	Lower 1/2	< 15.4	< 16.2	< 15.8
91-07673-A4B		Lower 1/2	< 38.6	< 40.6	< 39.6
91-07673-A4T		Upper 1/2	< 15.4	< 16.2	< 15.8
91-07673-A4T		Upper 1/2	< 38.6	< 40.6	< 39.6
92-03254-A1	Core 26 composite	Whole	< 20.3	< 20.3	< 20.3
92-03254-A1		Whole	67.1	47.8	57.45
92-03255-A1		Whole	55.2	55.5	55.35
92-03255-A1		Whole	< 20.1	< 18.6	< 19.3
92-10670-A1	Core 27 composite	Whole	< 18.8	< 19.3	< 19.1
92-10669-A1		Whole	< 20.6	< 13.1	< 16.8

Table B2-27. Tank 241-B-201 Analytical Results: Dysprosium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			μg/g	μg/g	μg/g
92-3254-H1	Core 26 composite	Whole	< 146	< 158	< 152
92-3254-H1		Whole	< 118	< 127	< 123
92-3255-H1		Whole	< 89.9	< 83.0	< 86.5
92-3255-H1		Whole	< 89.1	< 94.3	< 91.7
92-03251-H1B		Lower 1/2	< 80.7	< 76.7	< 78.7
92-03253-H1B		Lower 1/2	< 77.4	< 80.9	< 79.2
92-03250-HIT		Upper 1/2	< 74.8	< 79.5	< 77.2
92-03252-H1T		Upper 1/2	< 80.7	< 84.6	< 82.7
92-10669-H1	Core 27 composite	Whole	< 88.1	< 89.2	< 88.7
92-10670-H1		Whole	< 84.3	< 88.7	< 86.5
92-10669-H1B		Lower 1/2	< 83.5	< 85.9	< 84.7
92-10670-H1B		Lower 1/2	< 87.9	< 86.8	< 87.4
92-10669-H1T		Upper 1/2	< 86.9	< 79.5	< 83.2
92-10670-H1T		Upper 1/2	< 86.7	< 88.6	< 87.7
Solids: water digest			μg/g	μg/g	μg/g
92-3254-C1	Core 26 composite	Whole	< 9.92	---	< 9.92
92-3254-C1		Whole	< 1.98	< 2.09	< 2.04
92-3255-C1		Whole	< 1.98	< 2.04	< 2.01
92-10669-C1	Core 27 composite	Whole	< 2.01	< 2.02	< 2.02
92-10669-C1		Whole	< 4.03	< 4.04	< 4.04
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95
92-10670-C1		Whole	< 3.88	< 3.93	< 3.91

Table B2-28. Tank 241-B-201 Analytical Results: Europium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-03239-A	26: 3	Lower 1/2	< 20.5	< 18.5	< 19.5
92-03238-A		Upper 1/2	< 19.6	< 20.9	< 20.3
92-03241-A	26: 7	Lower 1/2	< 20.7	< 17.9	< 19.3
92-03240-A		Upper 1/2	< 19.8	< 17.5	< 18.7
91-07661-A4B	27: 3	Lower 1/2	< 7.55	< 7.85	< 7.70
91-07661-A4B		Lower 1/2	< 18.9	< 19.6	< 19.3
91-07661-A4T		Upper 1/2	< 7.74	< 8.07	< 7.91
91-07661-A4T		Upper 1/2	< 19.4	< 20.2	< 19.8
91-07673-A4B	27: 6	Lower 1/2	< 8.00	< 6.84	< 7.42
91-07673-A4B		Lower 1/2	< 20.0	< 17.1	< 18.6
91-07673-A4T		Upper 1/2	< 19.3	< 20.3	< 19.8
91-07673-A4T		Upper 1/2	< 7.71	< 8.12	< 7.92
92-03254-A1	Core 26 composite	Whole	< 2.03	< 2.03	< 2.03
92-03254-A1		Whole	< 10.2	< 10.2	< 10.2
92-03255-A1		Whole	< 2.01	< 1.86	< 1.94
92-03255-A1		Whole	< 10.0	< 9.29	< 9.65
92-10670-A1	Core 27 composite	Whole	< 9.42	< 9.65	< 9.54
92-10669-A1		Whole	< 10.3	< 6.54	< 8.42
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 72.8	< 79.1	< 76.0
92-3254-H1		Whole	< 58.9	< 63.7	< 61.3
92-3255-H1		Whole	< 44.9	< 41.5	< 43.2
92-3255-H1		Whole	< 44.5	< 47.2	< 45.9
92-03251-H1B		Lower 1/2	< 40.4	< 38.3	< 39.4
92-03253-H1B		Lower 1/2	< 38.7	< 40.5	< 39.6
92-03250-HIT		Upper 1/2	< 37.4	< 39.8	< 38.6
92-03252-H1T		Upper 1/2	< 40.4	< 42.3	< 41.4
92-10669-H1	Core 27 composite	Whole	< 44.1	< 44.6	< 44.4
92-10670-H1		Whole	< 42.1	< 44.4	< 43.3
92-10669-H1B		Lower 1/2	< 41.8	< 42.9	< 42.4
92-10670-H1B		Lower 1/2	< 44.0	< 43.4	< 43.7
92-10669-H1T		Upper 1/2	< 43.4	< 39.7	< 41.6
92-10670-H1T		Upper 1/2	< 43.4	< 44.0	< 43.7

Table B2-28. Tank 241-B-201 Analytical Results: Europium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 9.92	< 10.5	< 10.2
92-3254-C1		Whole	< 49.6	---	< 49.6
92-3255-C1		Whole	< 9.88	< 10.2	< 10.0
92-10669-C1	Core 27 composite	Whole	< 10.1	< 10.1	< 10.1
92-10669-C1		Whole	< 20.1	< 20.2	< 20.2
92-10670-C1		Whole	< 9.69	< 9.82	< 9.76
92-10670-C1		Whole	< 19.4	< 19.6	< 19.5

Table B2-29. Tank 241-B-201 Analytical Results: Gadolinium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 411	< 371	< 391
92-03238-A		Upper 1/2	< 393	< 418	< 405
92-03241-A	26: 7	Lower 1/2	< 414	< 359	< 386
92-03240-A		Upper 1/2	< 395	< 349	< 372
91-07661-A4B	27: 3	Lower 1/2	< 151	< 157	< 154
91-07661-A4B		Lower 1/2	< 377	< 393	< 385
91-07661-A4T		Upper 1/2	< 155	< 161	< 158
91-07661-A4T		Upper 1/2	< 387	< 403	< 395
91-07673-A4B	27: 6	Lower 1/2	< 160	< 137	< 148
91-07673-A4B		Lower 1/2	< 400	< 342	< 371
91-07673-A4T		Upper 1/2	< 154	< 162	< 158
91-07673-A4T		Upper ½	< 386	< 406	< 396
92-03254-A1	Core 26 composite	Whole	< 203	< 203	< 203
92-03254-A1		Whole	102.8	103.6	103.2
92-03255-A1		Whole	78.3	90.2	84.25
92-03255-A1		Whole	< 201	< 186	< 193
92-10670-A1	Core 27 composite	Whole	< 188	< 193	< 191
92-10669-A1		Whole	< 206	< 131	< 168

Table B2-29. Tank 241-B-201 Analytical Results: Gadolinium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 1,460	< 1,580	< 1,520
92-3254-H1		Whole	< 1,180	< 1,270	< 1,230
92-3255-H1		Whole	< 897	< 830	< 864
92-3255-H1		Whole	< 891	< 943	< 917
92-03251-H1B		Lower 1/2	< 807	< 767	< 787
92-03253-H1B		Lower 1/2	< 774	< 809	< 792
92-03250-HIT		Upper 1/2	< 748	< 795	< 772
92-03252-H1T		Upper 1/2	< 807	< 846	< 827
92-10669-H1	Core 27 composite	Whole	< 881	< 892	< 887
92-10670-H1		Whole	< 843	< 887	< 865
92-10669-H1B		Lower 1/2	< 835	< 859	< 847
92-10670-H1B		Lower 1/2	< 879	< 868	< 874
92-10669-H1T		Upper 1/2	< 867	< 795	< 831
92-10670-H1T		Upper 1/2	< 867	< 881	< 874
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-3254-C1	Core 26 composite	Whole	< 99.2	---	< 99.2
92-3254-C1		Whole	< 19.8	< 20.9	< 20.4
92-3255-C1		Whole	< 19.8	< 20.4	< 20.1
92-10669-C1	Core 27 composite	Whole	< 20.1	< 20.2	< 20.2
92-10669-C1		Whole	< 40.5	< 40.4	< 40.5
92-10670-C1		Whole	< 19.4	< 19.6	< 19.5
92-10670-C1		Whole	< 38.8	< 39.3	< 39.1

Table B2-30. Tank 241-B-201 Analytical Results: Iron (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	14,010.5	13,947.9	13,979.2
92-03238-A		Upper 1/2	13,870.3	15,490.6	14,680.5
92-03241-A	26: 7	Lower 1/2	7,745.3	7,720.3	7,732.8
92-03240-A		Upper 1/2	7,419.9	6,015.7	6,717.8
91-07661-A4B	27: 3	Lower 1/2	14,508	15,603	15,055.5
91-07661-A4B		Lower 1/2	14,620	15,559	15,089.5
91-07661-A4T		Upper 1/2	15,310	15,810	15,560
91-07661-A4T		Upper 1/2	15,611	15,937	15,774
91-07673-A4B	27: 6	Lower 1/2	8,552	8,107	8,329.5
91-07673-A4B		Lower 1/2	8,590	8,409	8,499.5
91-07673-A4T		Upper 1/2	8,159	8,020	8,089.5
91-07673-A4T		Upper 1/2	8,134	7,956	8,045
92-03254-A1	Core 26 composite	Whole	18,994.6	20,556.6	19,775.6
92-03254-A1		Whole	19,630.3	21,358.9	20,494.6
92-03255-A1		Whole	16,732.6	19,413	18,072.8
92-03255-A1		Whole	17,572.6	19,951.7	18,762.2
92-10670-A1	Core 27 composite	Whole	10,576	10,124	10,350
92-10669-A1		Whole	10,227	9,395	9,811
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	18,640.5	17,811.5	18,226
92-3254-H1		Whole	18,634.6	18,712.9	18,673.8
92-3255-H1		Whole	16,182.4	16,191.6	16,187
92-3255-H1		Whole	15,348.9	17,028.7	16,188.8
92-03251-H1B		Lower 1/2	21,792	23,513	22,652.5
92-03253-H1B		Lower 1/2	18,874	17,216	18,045
92-03250-HIT		Upper 1/2	18,569	19,514	19,041.5
92-03252-H1T		Upper 1/2	16,342	15,549	15,945.5
92-10669-H1	Core 27 composite	Whole	11,615	12,409	12,012
92-10670-H1		Whole	11,257	11,288	11,272.5
92-10669-H1B		Lower 1/2	12,066	11,557	11,811.5
92-10670-H1B		Lower 1/2	11,148	12,306	11,727
92-10669-H1T		Upper 1/2	10,853	12,939	11,896
92-10670-H1T		Upper 1/2	11,337	12,628	11,982.5

Table B2-30. Tank 241-B-201 Analytical Results: Iron (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	16.8	---	16.8
92-3254-C1		Whole	4.5	4.1	4.3
92-3255-C1		Whole	1.9	2.8	2.35
92-10669-C1	Core 27 composite	Whole	7	6	6.5
92-10669-C1		Whole	7	5	6
92-10670-C1		Whole	5	6	5.5
92-10670-C1		Whole	5	6	5.5

Table B2-31. Tank 241-B-201 Analytical Results: Lanthanum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	8,949.4	8,301.7	8,625.55
92-03238-A		Upper 1/2	8,994.1	10,127.3	9,560.7
92-03241-A	26: 7	Lower 1/2	18,829.7	18,180.2	18,505
92-03240-A		Upper 1/2	17,123.4	14,279.2	15,701.3
91-07661-A4B	27: 3	Lower 1/2	10,649	11,211	10,930
91-07661-A4B		Lower 1/2	10,674	11,378	11,026
91-07661-A4T		Upper 1/2	11,283	11,537	11,410
91-07661-A4T		Upper 1/2	11,184	11,559	11,371.5
91-07673-A4B	27: 6	Lower 1/2	16,176	15,496	15,836
91-07673-A4B		Lower 1/2	15,992	15,827	15,909.5
91-07673-A4T		Upper 1/2	15,276	15,042	15,159
91-07673-A4T		Upper 1/2	15,466	15,119	15,292.5
92-03254-A1	Core 26 composite	Whole	20,392	13,983.3	17,187.7
92-03254-A1		Whole	19,406.9	13,660.4	16,533.7
92-03255-A1		Whole	16,226.3	15,809	16,017.6
92-03255-A1		Whole	16,571.9	16,609.7	16,590.8
92-10670-A1	Core 27 composite	Whole	14,353	13,723	14,038
92-10669-A1		Whole	14,048	12,755	13,401.5

Table B2-31. Tank 241-B-201 Analytical Results: Lanthanum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	13,594.4	14,132.1	13,863.2
92-3254-H1		Whole	14,457.5	15,599.4	15,028.5
92-3255-H1		Whole	12,642.2	12,863.7	12,753
92-3255-H1		Whole	14,213.5	13,934.3	14,073.9
92-03251-H1B		Lower 1/2	15,135	15,687	15,411
92-03253-H1B		Lower 1/2	16,032	12,563	14,297.5
92-03250-HIT		Upper 1/2	15,541	16,548	16,044.5
92-03252-H1T		Upper 1/2	14,223	14,077	14,150
92-10669-H1	Core 27 composite	Whole	14,634	15,461	15,047.5
92-10670-H1		Whole	13,979	14,288	14,133.5
92-10669-H1B		Lower 1/2	13,281	13,880	13,580.5
92-10670-H1B		Lower 1/2	13,214	14,076	13,645
92-10669-H1T		Upper 1/2	12,804	15,713	14,258.5
92-10670-H1T		Upper 1/2	13,262	14,636	13,949
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	10.8	10.5	10.65
92-3254-C1		Whole	< 14.9	---	< 14.9
92-3255-C1		Whole	< 2.96	< 3.05	< 3.01
92-10669-C1	Core 27 composite	Whole	42	26	34
92-10669-C1		Whole	44	27	35.5
92-10670-C1		Whole	29	29	29
92-10670-C1		Whole	28	29	28.5

Table B2-32. Tank 241-B-201 Analytical Results: Lead (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	470.4	392.1	431.25
92-03238-A		Upper 1/2	443.6	491.2	467.4
92-03241-A	26: 7	Lower 1/2	< 124	118	121
92-03240-A		Upper 1/2	131.9	< 105	118
91-07661-A4B	27: 3	Lower 1/2	368	394	381
91-07661-A4B		Lower 1/2	372	392	382
91-07661-A4T		Upper 1/2	404	396	400
91-07661-A4T		Upper 1/2	429	414	421.5
91-07673-A4B	27: 6	Lower 1/2	104	110	107
91-07673-A4B		Lower 1/2	< 120	117	119
91-07673-A4T		Upper 1/2	125	< 122	123
91-07673-A4T		Upper 1/2	104	107	105.5
92-03254-A1	Core 26 composite	Whole	1,255.4	988	1,121.7
92-03254-A1		Whole	1,372	1,052.2	1,212.1
92-03255-A1		Whole	1,116.2	1,434.3	1,275.25
92-03255-A1		Whole	1,200.6	1,497.3	1,348.95
92-10670-A1	Core 27 composite	Whole	1,515	1,402	1,458.5
92-10669-A1		Whole	1,675	1,432	1,553.5
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	1,920.1	1,842.1	1,881.1
92-3254-H1		Whole	2,220.5	2,244.4	2,232.45
92-3255-H1		Whole	1,324.4	1,358.2	1,341.3
92-3255-H1		Whole	1,517.1	1,746.7	1,631.9
92-03251-H1B		Lower 1/2	1,508	1,570	1,539
92-03253-H1B		Lower 1/2	1,343	972	1,157.5
92-03250-HIT		Upper 1/2	1,477	1,641	1,559
92-03252-H1T		Upper 1/2	994	1,034	1,014
92-10669-H1	Core 27 composite	Whole	1,618	1,959	1,788.5
92-10670-H1		Whole	1,499	1,549	1,524
92-10669-H1B		Lower 1/2	1,570	1,533	1,551.5
92-10670-H1B		Lower 1/2	1,370	1,435	1,402.5
92-10669-H1T		Upper 1/2	1,509	1,804	1,656.5
92-10670-H1T		Upper 1/2	1,230	1,519	1,374.5

Table B2-32. Tank 241-B-201 Analytical Results: Lead (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 5.95	< 6.27	< 6.11
92-3254-C1		Whole	< 2.98	---	< 2.98
92-3255-C1		Whole	< 5.93	< 6.11	< 6.02
92-10669-C1	Core 27 composite	Whole	< 6.04	< 6.07	< 6.05
92-10669-C1		Whole	< 12.1	< 12.1	< 12.1
92-10670-C1		Whole	< 5.81	< 5.89	< 5.85
92-10670-C1		Whole	< 11.6	< 11.8	< 11.7

Table B2-33. Tank 241-B-201 Analytical Results: Lithium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 41.1	< 37.1	< 39.1
92-03238-A		Upper 1/2	< 39.3	< 41.8	< 40.6
92-03241-A	26: 7	Lower 1/2	< 41.4	< 35.9	< 38.7
92-03240-A		Upper 1/2	< 39.5	< 34.9	< 37.2
91-07661-A4B	27: 3	Lower 1/2	< 15.1	< 15.7	< 15.4
91-07661-A4B		Lower 1/2	< 37.7	< 39.3	< 38.5
91-07661-A4T		Upper 1/2	< 15.5	< 16.1	< 15.8
91-07661-A4T		Upper 1/2	< 38.7	< 40.3	< 40.0
91-07673-A4B	27: 6	Lower 1/2	< 15.4	< 16.2	< 15.8
91-07673-A4B		Lower 1/2	< 38.6	< 40.6	< 39.6
91-07673-A4T		Upper 1/2	< 15.4	< 16.2	< 15.8
91-07673-A4T		Upper 1/2	< 38.6	< 40.6	< 39.6
92-03254-A1	Core 26 composite	Whole	< 20.3	< 20.3	< 20.3
92-03254-A1		Whole	< 4.06	< 4.06	< 4.06
92-03255-A1		Whole	< 4.02	< 3.72	< 3.87
92-03255-A1		Whole	< 20.1	< 18.6	< 19.3
92-10670-A1	Core 27 composite	Whole	< 18.8	< 19.3	< 19.1
92-10669-A1		Whole	< 20.6	< 13.1	< 16.8

Table B2-33. Tank 241-B-201 Analytical Results: Lithium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 146	< 158	< 152
92-3254-H1		Whole	< 118	< 127	< 123
92-3255-H1		Whole	< 89.9	< 83.0	< 86.5
92-3255-H1		Whole	< 89.1	< 94.3	< 91.7
92-03251-H1B		Lower 1/2	< 80.7	< 76.7	< 78.7
92-03253-H1B		Lower 1/2	< 77.4	< 80.9	< 79.2
92-03250-HIT		Upper 1/2	< 74.8	< 79.5	< 77.2
92-03252-H1T		Upper 1/2	< 80.7	< 84.6	< 82.7
92-10669-H1	Core 27 composite	Whole	< 88.1	< 89.2	< 88.7
92-10670-H1		Whole	< 84.3	< 88.7	< 86.5
92-10669-H1B		Lower 1/2	< 83.5	< 85.9	< 84.7
92-10670-H1B		Lower 1/2	< 87.9	< 86.8	< 87.4
92-10669-H1T		Upper 1/2	< 86.9	< 79.5	< 83.2
92-10670-H1T		Upper 1/2	< 86.7	< 88.6	< 87.7
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 9.92	---	< 9.92
92-3254-C1		Whole	< 1.98	< 2.09	< 2.04
92-3255-C1		Whole	< 1.98	< 2.04	< 2.01
92-10669-C1	Core 27 composite	Whole	< 2.01	< 2.02	< 2.02
92-10669-C1		Whole	< 4.03	< 4.04	< 4.04
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95
92-10670-C1		Whole	< 3.88	< 3.93	< 3.91

Table B2-34. Tank 241-B-201 Analytical Results: Magnesium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-03239-A	26: 3	Lower 1/2	1,654.3	1,617.5	1,635.9
92-03238-A		Upper 1/2	1,630.1	1,714.8	1,672.45
92-03241-A	26: 7	Lower 1/2	247.3	232.7	240
92-03240-A		Upper 1/2	257.6	203.1	230.35
91-07661-A4B	27: 3	Lower 1/2	919	921	920
91-07661-A4B		Lower 1/2	940	933	936.5
91-07661-A4T		Upper 1/2	899	931	915
91-07661-A4T		Upper 1/2	935	962	948.5
91-07673-A4B	27: 6	Lower 1/2	304	277	290.5
91-07673-A4B		Lower 1/2	358	336	347
91-07673-A4T		Upper 1/2	332	338	335
91-07673-A4T		Upper 1/2	299	304	301.5
92-03254-A1	Core 26 composite	Whole	2,490.1	3,051	2,770.55
92-03254-A1		Whole	2,424.1	3,075.4	2,749.75
92-03255-A1		Whole	1,997.4	1,999.8	1,998.6
92-03255-A1		Whole	2,029.5	2,071.3	2,050.4
92-10670-A1	Core 27 composite	Whole	657	636	646.5
92-10669-A1		Whole	649	579	614
Solids: fusion digest			μg/g	μg/g	μg/g
92-3254-H1	Core 26 composite	Whole	2,707.2	2,648.4	2,677.8
92-3254-H1		Whole	2,434.9	2,406.8	2,420.85
92-3255-H1		Whole	2,020.3	2,316.6	2,168.45
92-3255-H1		Whole	2,155.6	2,184.3	2,169.95
92-03251-H1B		Lower 1/2	3,043	2,809	2,926
92-03253-H1B		Lower 1/2	2,336	2,131	2,233.5
92-03250-HIT		Upper 1/2	2,442	2,526	2,484
92-03252-H1T		Upper 1/2	1,984	1,980	1,982
92-10669-H1	Core 27 composite	Whole	642	618	630
92-10670-H1		Whole	592	616	604
92-10669-H1B		Lower 1/2	615	614	614.5
92-10670-H1B		Lower 1/2	581	599	590
92-10669-H1T		Upper 1/2	551	629	590
92-10670-H1T		Upper 1/2	568	639	603.5

Table B2-34. Tank 241-B-201 Analytical Results: Magnesium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 7.94	< 8.36	< 8.15
92-3254-C1		Whole	< 39.7	---	< 39.7
92-3255-C1		Whole	33.8	39.1	36.45
92-10669-C1	Core 27 composite	Whole	< 8.06	< 8.09	< 8.08
92-10669-C1		Whole	< 16.1	< 16.2	< 16.2
92-10670-C1		Whole	< 7.75	< 7.86	< 7.81
92-10670-C1		Whole	< 15.5	< 15.7	< 15.6

Table B2-35. Tank 241-B-201 Analytical Results: Manganese (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	15,910.4	14,574.3	15,242.3
92-03238-A		Upper 1/2	15,941.1	17,952	16,946.5
92-03241-A	26: 7	Lower 1/2	29,856.3	29,224.6	29,540.4
92-03240-A		Upper 1/2	27,580.1	22,513.1	25,046.6
91-07661-A4B	27: 3	Lower 1/2	18,160	19,168	18,664
91-07661-A4B		Lower 1/2	---	---	---
91-07661-A4T		Upper 1/2	---	---	---
91-07661-A4T		Upper 1/2	19,311	19,714	19,512.5
91-07673-A4B	27: 6	Lower 1/2	31,520	31,511	31,515.5
91-07673-A4B		Lower 1/2	---	---	---
91-07673-A4T		Upper 1/2	30,185	29,458	29,821.5
91-07673-A4T		Upper 1/2	---	---	---
92-03254-A1	Core 26 composite	Whole	34,477.5	22,963.6	28,720.5
92-03254-A1		Whole	---	---	---
92-03255-A1		Whole	---	---	---
92-03255-A1		Whole	27,690.1	27,345.3	27,517.7
92-10670-A1	Core 27 composite	Whole	27,067	25,516	26,291.5
92-10669-A1		Whole	25,805	25,765	25,785

Table B2-35. Tank 241-B-201 Analytical Results: Manganese (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	20,701.1	21,506.8	21,103.9
92-3254-H1		Whole	22,269.6	23,634.7	22,952.2
92-3255-H1		Whole	21,810	21,759.9	21,785
92-3255-H1		Whole	19,511.4	20,768.6	20,140
92-03251-H1B		Lower 1/2	23,084	23,843	23,463.5
92-03253-H1B		Lower 1/2	25,343	19,963	22,653
92-03250-HIT		Upper 1/2	23,943	25,389	24,666
92-03252-H1T		Upper 1/2	22,422	22,209	22,315.5
92-10669-H1	Core 27 composite	Whole	24,143	25,880	25,011.5
92-10670-H1		Whole	23,542	24,200	23,871
92-10669-H1B		Lower 1/2	21,991	22,904	22,447.5
92-10670-H1B		Lower 1/2	21,945	23,526	22,735.5
92-10669-H1T		Upper 1/2	20,990	25,819	23,404.5
92-10670-H1T		Upper 1/2	22,180	24,366	23,273
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	3.5	---	3.5
92-3254-C1		Whole	3.6	2.7	3.15
92-3255-C1		Whole	0.7	1.3	1
92-10669-C1	Core 27 composite	Whole	5	3	4
92-10669-C1		Whole	5	4	4.5
92-10670-C1		Whole	4	4	4
92-10670-C1		Whole	4	4	4

Table B2-36. Tank 241-B-201 Analytical Results: Molybdenum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-03239-A	26: 3	Lower ½	< 41.1	< 37.1	< 39.1
92-03238-A		Upper 1/2	< 39.3	< 41.8	< 40.6
92-03241-A	26: 7	Lower 1/2	< 41.4	< 35.9	< 37.2
92-03240-A		Upper 1/2	< 39.5	< 34.9	< 37.2
91-07661-A4B	27: 3	Lower 1/2	< 37.7	< 39.3	< 38.5
91-07661-A4B		Lower 1/2	< 15.1	< 15.7	< 15.4
91-07661-A4T		Upper 1/2	< 15.5	< 16.1	< 15.8
91-07661-A4T		Upper 1/2	< 38.7	< 40.3	< 39.5
91-07673-A4B	27: 6	Lower 1/2	21	21	21
91-07673-A4B		Lower 1/2	< 40.0	< 34.2	< 37.1
91-07673-A4T		Upper 1/2	< 38.6	< 40.6	< 39.6
91-07673-A4T		Upper 1/2	20	20	20
92-03254-A1	Core 26 composite	Whole	< 20.3	< 20.3	< 20.3
92-03254-A1		Whole	20.7	15.5	18.1
92-03255-A1		Whole	17.2	17.5	17.35
92-03255-A1		Whole	< 20.1	< 18.6	< 19.3
92-10670-A1	Core 27 composite	Whole	< 18.8	< 19.3	< 19.1
92-10669-A1		Whole	< 20.6	< 13.1	< 16.9
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	146	158	152
92-3254-H1		Whole	118	127	123
92-3255-H1		Whole	89.9	83.0	86.5
92-3255-H1		Whole	89.1	94.3	91.7
92-03251-H1B		Lower 1/2	80.7	76.7	78.7
92-03253-H1B		Lower 1/2	77.3	80.9	79.1
92-03250-HIT		Upper 1/2	74.8	79.5	77.2
92-03252-H1T		Upper 1/2	80.7	84.6	82.7
92-10669-H1	Core 27 composite	Whole	88.1	89.2	88.7
92-10670-H1		Whole	84.3	88.7	86.5
92-10669-H1B		Lower 1/2	83.5	85.8	84.7
92-10670-H1B		Lower 1/2	87.9	86.8	87.4
92-10669-H1T		Upper 1/2	86.9	79.5	83.2
92-10670-H1T		Upper 1/2	86.7	88.1	87.4

Table B2-36. Tank 241-B-201 Analytical Results: Molybdenum (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 1.98	< 2.09	< 2.00
92-3254-C1		Whole	< 9.92	---	< 9.92
92-3255-C1		Whole	< 1.98	< 2.04	< 2.01
92-10669-C1	Core 27 composite	Whole	< 2.01	< 2.02	< 2.02
92-10669-C1		Whole	< 4.03	< 4.04	< 4.04
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95
92-10670-C1		Whole	< 3.88	< 3.93	< 3.90

Table B2-37. Tank 241-B-201 Analytical Results: Neodymium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 61.6	< 55.6	< 58.6
92-03238-A		Upper 1/2	< 58.9	< 62.6	< 60.8
92-03241-A	26: 7	Lower 1/2	< 62.0	< 53.8	< 57.9
92-03240-A		Upper 1/2	< 59.3	< 52.4	< 55.8
91-07661-A4B	27: 3	Lower 1/2	< 56.6	< 58.9	< 57.8
91-07661-A4B		Lower 1/2	< 22.6	< 23.6	< 23.1
91-07661-A4T		Upper 1/2	< 58.1	< 60.5	< 59.3
91-07661-A4T		Upper 1/2	< 23.2	< 24.2	< 23.7
91-07673-A4B	27: 6	Lower 1/2	< 24.0	< 20.5	< 22.3
91-07673-A4B		Lower 1/2	< 60.0	< 51.3	< 55.6
91-07673-A4T		Upper 1/2	< 57.8	< 60.9	< 59.3
91-07673-A4T		Upper 1/2	< 23.1	< 24.5	< 23.8
92-03254-A1	Core 26 composite	Whole	< 30.5	< 30.5	< 30.5
92-03254-A1		Whole	< 6.09	< 6.09	< 6.09
92-03255-A1		Whole	< 6.01	< 5.57	< 5.79
92-03255-A1		Whole	< 30.1	< 27.9	< 29.0
92-10670-A1	Core 27 composite	Whole	< 28.3	< 29.0	< 28.7
92-10669-A1		Whole	< 31.0	< 19.6	< 25.3

Table B2-37. Tank 241-B-201 Analytical Results: Neodymium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 218	< 237	< 228
92-3254-H1		Whole	< 177	< 191	< 184
92-3255-H1		Whole	< 135	< 124	< 130
92-3255-H1		Whole	< 134	< 142	< 138
92-03251-H1B		Lower 1/2	< 121	133	127
92-03253-H1B		Lower 1/2	< 116	< 121	< 119
92-03250-HIT		Upper 1/2	< 112	< 119	< 116
92-03252-H1T		Upper 1/2	121	127	124
92-10669-H1	Core 27 composite	Whole	132	139	133
92-10670-H1		Whole	126	133	130
92-10669-H1B		Lower 1/2	125	129	127
92-10670-H1B		Lower 1/2	132	130	131
92-10669-H1T		Upper 1/2	130	119	125
92-10670-H1T		Upper 1/2	130	132	131
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 14.9	---	< 14.9
92-3254-C1		Whole	< 2.98	< 3.14	< 3.06
92-3255-C1		Whole	< 2.96	< 3.05	< 3.02
92-10669-C1	Core 27 composite	Whole	< 3.02	< 3.03	< 3.03
92-10669-C1		Whole	< 6.04	< 6.06	< 6.05
92-10670-C1		Whole	< 5.81	< 5.89	< 5.85
92-10670-C1		Whole	< 2.91	< 2.95	< 2.93

Table B2-38. Tank 241-B-201 Analytical Results: Nickel (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**μg/g**	**μg/g**	**μg/g**
92-03239-A	26: 3	Lower 1/2	466.3	431	448.65
92-03238-A		Upper 1/2	483.7	535.3	509.5
92-03241-A	26: 7	Lower 1/2	278.7	281.5	280.1
92-03240-A		Upper 1/2	279.4	223.4	251.4
91-07661-A4B	27: 3	Lower 1/2	562	588	575
91-07661-A4B		Lower 1/2	558	595	576.5
91-07661-A4T		Upper 1/2	586	602	594
91-07661-A4T		Upper 1/2	594	606	600
91-07673-A4B	27: 6	Lower 1/2	403	386	394.5
91-07673-A4B		Lower 1/2	409	399	404
91-07673-A4T		Upper 1/2	388	373	380.5
91-07673-A4T		Upper 1/2	387	377	382
92-03254-A1	Core 26 composite	Whole	576.6	430.9	503.75
92-03254-A1		Whole	553.9	414.2	484.05
92-03255-A1		Whole	440.7	434.3	437.5
92-03255-A1		Whole	470.3	452.8	461.55
92-10670-A1	Core 27 composite	Whole	502	487	494.5
92-10669-A1		Whole	480	441	460.5
Solids: fusion digest			**μg/g**	**μg/g**	**μg/g**
92-3254-H1	Core 26 composite	Whole	562.1	623.5	592.8
92-3255-H1		Whole	760.1	584.4	672.25
Solids: water digest			**μg/g**	**μg/g**	**μg/g**
92-3254-C1	Core 26 composite	Whole	< 14.9	---	< 14.9
92-3254-C1		Whole	< 2.98	< 3.14	< 3.06
92-3255-C1		Whole	< 2.96	< 3.05	< 3.02
92-10669-C1	Core 27 composite	Whole	4	4	4
92-10669-C1		Whole	< 6.04	< 6.06	< 6.05
92-10670-C1		Whole	< 5.81	< 5.89	< 5.85
92-10670-C1		Whole	4	4	4

Table B2-39. Tank 241-B-201 Analytical Results: Palladium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 308	< 278	< 293
92-03238-A		Upper 1/2	< 295	< 313	< 304
92-03241-A	26: 7	Lower 1/2	< 310	< 269	< 290
92-03240-A		Upper 1/2	< 297	< 262	< 280
91-07661-A4B	27: 3	Lower 1/2	< 113	< 118	< 116
91-07661-A4B		Lower 1/2	< 283	< 294	< 289
91-07661-A4T		Upper 1/2	< 116	< 121	< 119
91-07661-A4T		Upper 1/2	< 290	< 302	< 296
91-07673-A4B	27: 6	Lower 1/2	< 120	< 103	< 112
91-07673-A4B		Lower 1/2	< 300	< 256	< 278
91-07673-A4T		Upper 1/2	< 116	< 122	< 119
91-07673-A4T		Upper 1/2	< 289	< 304	< 297
92-03254-A1	Core 26 composite	Whole	< 152	< 152	< 152
92-03254-A1		Whole	< 30.5	< 30.5	< 30.5
92-03255-A1		Whole	< 151	< 139	< 145
92-03255-A1		Whole	< 30.1	< 27.9	< 29.0
92-10670-A1	Core 27 composite	Whole	< 141	< 145	< 143
92-10669-A1		Whole	< 155	< 98.1	< 127
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 1,090	< 1,190	< 1,140
92-3254-H1		Whole	< 884	< 955	< 920
92-3255-H1		Whole	< 668	< 708	< 688
92-3255-H1		Whole	< 674	< 622	< 648
92-03251-H1B		Lower 1/2	< 606	< 575	< 591
92-03253-H1B		Lower 1/2	< 580	< 607	< 594
92-03250-HIT		Upper 1/2	< 561	< 596	< 579
92-03252-H1T		Upper 1/2	< 606	< 635	< 621
92-10669-H1	Core 27 composite	Whole	< 661	< 669	< 665
92-10670-H1		Whole	< 632	< 666	< 649
92-10669-H1B		Lower 1/2	< 626	< 644	< 635
92-10670-H1B		Lower 1/2	< 659	< 651	< 655
92-10669-H1T		Upper 1/2	< 651	< 596	< 624
92-10670-H1T		Upper 1/2	< 650	< 660	< 655

Table B2-39. Tank 241-B-201 Analytical Results: Palladium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 74.4	---	< 74.4
92-3254-C1		Whole	< 14.9	< 15.7	< 15.3
92-3255-C1		Whole	< 14.8	< 15.3	< 15.1
92-10669-C1	Core 27 composite	Whole	< 15.1	< 15.2	< 15.2
92-10669-C1		Whole	< 30.2	< 30.3	< 30.3
92-10670-C1		Whole	< 14.5	< 14.7	< 14.6
92-10670-C1		Whole	< 29.1	< 29.5	< 29.3

Table B2-40. Tank 241-B-201 Analytical Results: Phosphorus (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	4,679.1	4,347.3	4,513.2
92-03238-A		Upper 1/2	4,616.9	5,087.7	4,852.3
92-03241-A	26: 7	Lower 1/2	4,552.9	4,410.6	4,481.75
92-03240-A		Upper 1/2	4,294.2	3,490.4	3,892.3
91-07661-A4B	27: 3	Lower 1/2	5,554	5,834	5,694
91-07661-A4B		Lower 1/2	5,558	5,933	5,745.5
91-07661-A4T		Upper 1/2	5,837	6,035	5,936
91-07661-A4T		Upper 1/2	5,878	6,025	5,951.5
91-07673-A4B	27: 6	Lower 1/2	4,023	3,885	3,954
91-07673-A4B		Lower 1/2	4,044	3,964	4,004
91-07673-A4T		Upper 1/2	3,915	3,869	3,892
91-07673-A4T		Upper 1/2	3,860	3,822	3,841
92-03254-A1	Core 26 composite	Whole	8,008.5	7,016	7,512.25
92-03254-A1		Whole	8,138.5	7,200.9	7,669.7
92-03255-A1		Whole	6,303.6	6,279	6,291.3
92-03255-A1		Whole	6,484.5	6,347.8	6,416.15
92-10670-A1	Core 27 composite	Whole	4,793	4,612	4,702.5
92-10669-A1		Whole	4,782	4,363	4,572.5

Table B2-40. Tank 241-B-201 Analytical Results: Phosphorus (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	5,189.5	5,440	5,314.75
92-3254-H1		Whole	6,504.1	7,022.9	6,763.5
92-3255-H1		Whole	5,584.3	5,734.7	5,659.5
92-3255-H1		Whole	1,733.9	1,179	1,456.45
92-03251-H1B		Lower 1/2	7,170	7,216	7,193
92-03253-H1B		Lower 1/2	6,574	5,753	6,163.5
92-03250-HIT		Upper 1/2	6,615	7,080	6,847.5
92-03252-H1T		Upper 1/2	5,846	5,776	5,811
92-10669-H1	Core 27 composite	Whole	4,693	4,944	4,818.5
92-10670-H1		Whole	4,491	4,663	4,577
92-10669-H1B		Lower 1/2	4,518	4,701	4,609.5
92-10670-H1B		Lower 1/2	4,493	4,822	4,657.5
92-10669-H1T		Upper 1/2	4,317	5,305	4,811
92-10670-H1T		Upper 1/2	4,405	4,751	4,578
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-3254-C1	Core 26 composite	Whole	302.2	---	302.2
92-3254-C1		Whole	303.7	356.8	330.25
92-3255-C1		Whole	320.2	411.2	365.7
92-10669-C1	Core 27 composite	Whole	501	477	489
92-10669-C1		Whole	508	497	502.5
92-10670-C1		Whole	460	472	466
92-10670-C1		Whole	473	488	480.5

Table B2-41. Tank 241-B-201 Analytical Results: Potassium (ICP).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-03239-A	26: 3	Lower 1/2	3,393	2,491	2,942
92-03238-A		Upper 1/2	2,878	3,514	3,196
92-03241-A	26: 7	Upper 1/2	< 2,070	< 1,790	< 1,930
92-03240-A		Upper 1/2	3,541	2,084	2,812.5
91-07661-A4B	27: 3	Lower 1/2	3,223	3,241	3,232
91-07661-A4B		Lower 1/2	3,592	3,742	3,667
91-07661-A4T		Upper 1/2	3,092	3,386	3,239
91-07661-A4T		Upper 1/2	3,752	3,838	3,795
91-07673-A4B	27: 6	Lower 1/2	2,898	3,227	3,062.5
91-07673-A4B		Lower 1/2	2,182	2,456	2,319
91-07673-A4T		Upper 1/2	2,172	< 2,030	2,100
91-07673-A4T		Upper 1/2	2,477	2,769	2,623
92-03254-A1	Core 26 composite	Whole	6,984.9	7,053.6	7,019.25
92-03254-A1		Whole	7,102.7	7,365.4	7,234.05
92-03255-A1		Whole	5,803.3	5,795.1	5,799.2
92-03255-A1		Whole	6,060.5	6,423.9	6,242.2
92-10670-A1	Core 27 composite	Whole	5,293	4,525	4,909
92-10669-A1		Whole	5,224	4,621	4,922.5
Solids: fusion digest			μg/g	μg/g	μg/g
92-3254-H1	Core 26 composite	Whole	15,255	16,197	15,726
92-3255-H1		Whole	12,321	14,845	13,583
Solids: water digest			μg/g	μg/g	μg/g
92-3254-C1	Core 26 composite	Whole	4,459.8	---	4,459.8
92-3254-C1		Whole	4,730.2	4,986.5	4,858.35
92-3255-C1		Whole	5,027.6	5,614.9	5,321.25
92-10669-C1	Core 27 composite	Whole	4,503	4,211	4,357
92-10669-C1		Whole	4,616	4,360	4,488
92-10670-C1		Whole	4,089	4,159	4,124
92-10670-C1		Whole	4,187	4,211	4,199

Table B2-42. Tank 241-B-201 Analytical Results: Rhodium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-03239-A	26: 3	Lower 1/2	< 205	< 185	< 195
92-03238-A		Upper 1/2	< 196	< 209	< 203
92-03241-A	26: 7	Lower 1/2	< 207	< 179	< 193
92-03240-A		Upper 1/2	< 198	< 175	< 187
91-07661-A4B	27: 3	Lower 1/2	< 75.5	< 78.5	< 77.0
91-07661-A4B		Lower 1/2	< 189	< 196	< 193
91-07661-A4T		Upper 1/2	< 77.4	< 80.7	< 79.1
91-07661-A4T		Upper 1/2	< 194	< 202	< 198
91-07673-A4B	27: 6	Lower 1/2	< 80.0	< 68.4	< 74.2
91-07673-A4B		Lower 1/2	< 200	< 171	< 186
91-07673-A4T		Upper 1/2	< 77.1	< 81.2	< 79.2
91-07673-A4T		Upper 1/2	< 193	< 203	< 198
92-03254-A1	Core 26 composite	Whole	< 20.3	< 20.3	< 20.3
92-03254-A1		Whole	< 102	< 102	< 102
92-03255-A1		Whole	< 20.1	< 18.6	< 19.4
92-03255-A1		Whole	< 100	< 92.9	< 96.5
92-10670-A1	Core 27 composite	Whole	< 94.2	< 96.5	< 95.4
92-10669-A1		Whole	< 103	< 65.4	< 84.2
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 728	< 791	< 760
92-3254-H1		Whole	< 589	< 637	< 613
92-3255-H1		Whole	< 445	< 472	< 459
92-3255-H1		Whole	< 449	< 415	< 432
92-03251-H1B		Lower 1/2	< 404	< 383	< 394
92-03253-H1B		Lower 1/2	< 387	< 405	< 396
92-03250-HIT		Upper 1/2	< 374	< 398	< 386
92-03252-H1T		Upper 1/2	< 404	< 423	< 414
92-10669-H1	Core 27 composite	Whole	< 441	< 446	< 444
92-10670-H1		Whole	< 421	< 444	< 433
92-10669-H1B		Lower 1/2	< 418	< 429	< 424
92-10670-H1B		Lower 1/2	< 440	< 434	< 437
92-10669-H1T		Upper 1/2	< 434	< 397	< 416
92-10670-H1T		Upper 1/2	< 434	< 440	< 437

Table B2-42. Tank 241-B-201 Analytical Results: Rhodium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 49.6	---	< 49.6
92-3254-C1		Whole	< 9.92	< 10.5	< 10.2
92-3255-C1		Whole	< 9.88	< 10.2	< 10.0
92-10669-C1	Core 27 composite	Whole	< 10.1	< 10.1	< 10.1
92-10669-C1		Whole	< 20.1	< 20.2	< 20.2
92-10670-C1		Whole	< 9.69	< 9.82	< 9.76
92-10670-C1		Whole	< 19.4	< 19.6	< 19.5

Table B2-43. Tank 241-B-201 Analytical Results: Ruthenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 103	< 92.7	< 97.9
92-03238-A		Upper 1/2	< 98.2	< 104	< 101
92-03241-A	26: 7	Lower 1/2	< 103	< 89.6	< 96.3
92-03240-A		Upper 1/2	< 98.9	< 87.3	< 93.1
91-07661-A4B	27: 3	Lower 1/2	< 37.7	< 39.3	< 38.5
91-07661-A4B		Lower 1/2	< 94.4	< 98.2	< 96.3
91-07661-A4T		Upper 1/2	< 38.7	< 40.3	< 39.5
91-07661-A4T		Upper 1/2	< 96.8	< 101	< 98.9
91-07673-A4B	27: 6	Lower 1/2	< 40.0	< 34.2	< 37.1
91-07673-A4B		Lower 1/2	< 100	< 85.4	< 92.7
91-07673-A4T		Upper 1/2	< 38.6	< 40.6	< 39.6
91-07673-A4T		Upper 1/2	< 96.4	< 101	< 98.7
92-03254-A1	Core 26 composite	Whole	< 10.2	< 10.2	< 10.2
92-03254-A1		Whole	< 50.8	< 50.8	< 50.8
92-03255-A1		Whole	< 10.0	< 9.29	< 9.65
92-03255-A1		Whole	< 50.2	< 46.4	< 48.3
92-10670-A1	Core 27 composite	Whole	< 47.1	< 48.3	< 47.7
92-10669-A1		Whole	< 51.6	< 32.7	< 42.2

Table B2-43. Tank 241-B-201 Analytical Results: Ruthenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 364	< 396	< 380
92-3254-H1		Whole	< 295	< 318	< 307
92-3255-H1		Whole	< 223	< 236	< 230
92-3255-H1		Whole	< 225	< 207	< 216
92-03251-H1B		Lower 1/2	< 202	< 192	< 197
92-03253-H1B		Lower 1/2	< 193	< 202	< 198
92-03250-HIT		Upper 1/2	< 187	< 199	< 193
92-03252-H1T		Upper 1/2	< 202	< 212	< 207
92-10669-H1	Core 27 composite	Whole	< 220	< 223	< 222
92-10670-H1		Whole	< 211	< 222	< 217
92-10669-H1B		Lower 1/2	< 209	< 215	< 212
92-10670-H1B		Lower 1/2	< 220	< 217	< 219
92-10669-H1T		Upper 1/2	< 217	< 199	< 208
92-10670-H1T		Upper 1/2	< 217	< 220	< 219
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 24.8	---	< 24.8
92-3254-C1		Whole	< 4.96	< 5.23	< 5.10
92-3255-C1		Whole	< 4.94	< 5.09	< 5.02
92-10669-C1	Core 27 composite	Whole	< 5.04	< 5.06	< 5.05
92-10669-C1		Whole	< 10.1	< 10.1	< 10.1
92-10670-C1		Whole	< 4.85	< 4.91	< 4.88
92-10670-C1		Whole	< 9.69	< 9.82	< 9.76

Table B2-44. Tank 241-B-201 Analytical Results: Selenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-03239-A	26: 3	Lower 1/2	< 154	< 139	< 147
92-03238-A		Upper 1/2	< 147	< 157	< 152
92-03241-A	26: 7	Lower 1/2	< 155	< 134	< 145
92-03240-A		Upper 1/2	< 148	< 131	< 140
91-07661-A4B	27: 3	Lower 1/2	< 56.6	< 58.9	< 57.8
91-07661-A4B		Lower 1/2	< 142	< 147	< 145
91-07661-A4T		Upper 1/2	< 58.1	< 60.5	< 59.3
91-07661-A4T		Upper 1/2	< 145	< 151	< 148
91-07673-A4B	27: 6	Lower 1/2	< 60.0	< 51.3	< 55.7
91-07673-A4B		Lower 1/2	< 150	< 128	< 139
91-07673-A4T		Upper 1/2	< 57.8	< 60.9	< 59.4
91-07673-A4T		Upper 1/2	< 145	< 152	< 149
92-03254-A1	Core 26 composite	Whole	< 76.2	< 76.2	< 76.2
92-03254-A1		Whole	60.3	40.5	50.4
92-03255-A1		Whole	46.4	49.1	47.75
92-03255-A1		Whole	< 75.4	< 69.7	< 72.6
92-10670-A1	Core 27 composite	Whole	< 70.6	< 72.4	< 71.5
92-10669-A1		Whole	< 77.4	< 49.0	< 63.2
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 546	< 593	< 570
92-3254-H1		Whole	< 442	< 478	< 460
92-3255-H1		Whole	< 334	< 354	< 344
92-3255-H1		Whole	< 337	< 311	< 324
92-03251-H1B		Lower 1/2	< 303	< 288	< 296
92-03253-H1B		Lower 1/2	< 290	< 303	< 297
92-03250-H1T		Upper 1/2	< 280	< 298	< 289
92-03252-H1T		Upper 1/2	< 303	< 317	< 310
92-10669-H1	Core 27 composite	Whole	< 331	< 335	< 333
92-10670-H1		Whole	< 316	< 333	< 325
92-10669-H1B		Lower 1/2	< 313	< 322	< 318
92-10670-H1B		Lower 1/2	< 330	< 326	< 328
92-10669-H1T		Upper 1/2	< 326	< 298	< 312
92-10670-H1T		Upper 1/2	< 325	< 330	< 328

Table B2-44. Tank 241-B-201 Analytical Results: Selenium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 7.44	< 7.84	< 7.64
92-3254-C1		Whole	< 37.2	---	< 37.2
92-3255-C1		Whole	< 7.41	< 7.64	< 7.53
92-10669-C1	Core 27 composite	Whole	< 7.55	< 7.58	< 7.57
92-10669-C1		Whole	< 15.1	< 15.2	< 15.2
92-10670-C1		Whole	< 7.27	< 7.37	< 7.32
92-10670-C1		Whole	< 14.5	< 14.7	< 14.6

Table B2-45. Tank 241-B-201 Analytical Results: Silicon (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	2,392.9	2,566.5	2,479.7
92-03238-A		Upper 1/2	2,137.5	2,611.7	2,374.6
92-03241-A	26: 7	Lower 1/2	1,884	1,943.5	1,913.75
92-03240-A		Upper 1/2	1,091.9	1,373.1	1,232.5
91-07661-A4B	27: 3	Lower 1/2	13,867	15,077	14,472
91-07661-A4B		Lower 1/2	14,122	15,179	14,650.5
91-07661-A4T		Upper 1/2	13,994	14,640	14,317
91-07661-A4T		Upper 1/2	14,553	14,902	14,727.5
91-07673-A4B	27: 6	Lower 1/2	1,825	1,724	1,774.5
91-07673-A4B		Lower 1/2	1,819	1,767	1,793
91-07673-A4T		Upper 1/2	1,628	1,733	1,680.5
91-07673-A4T		Upper 1/2	1,637	1,758	1,697.5
92-03254-A1	Core 26 composite	Whole	3,094.3	3,223.6	3,158.95
92-03254-A1		Whole	2,977.6	3,111.9	3,044.75
92-03255-A1		Whole	2,710.7	2,721.5	2,716.1
92-03255-A1		Whole	2,796.1	2,733.6	2,764.85
92-10670-A1	Core 27 composite	Whole	2,066	1,833	1,949.5
92-10669-A1		Whole	1,733	1,972	1,852.5

Table B2-45. Tank 241-B-201 Analytical Results: Silicon (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	55,255.6	59,723.4	57,489.5
92-3254-H1		Whole	61,229.6	60,152.5	60,691.1
92-3255-H1		Whole	37,889.2	39,666	38,777.6
92-3255-H1		Whole	44,881.2	47,720	46,300.6
92-03251-H1B		Lower 1/2	38,728	33,977	36,352.5
92-03253-H1B		Lower 1/2	29,364	25,097	27,230.5
92-03250-HIT		Upper 1/2	29,634	30,620	30,127
92-03252-H1T		Upper 1/2	23,613	23,394	23,503.5
92-10669-H1	Core 27 composite	Whole	6,949	7,728	7,338.5
92-10670-H1		Whole	7,314	7,672	7,493
92-10669-H1B		Lower 1/2	5,962	7,522	6,742
92-10670-H1B		Lower 1/2	6,066	6,615	6,340.5
92-10669-H1T		Upper 1/2	5,655	7,078	6,366.5
92-10670-H1T		Upper 1/2	5,723	6,640	6,181.5
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-3254-C1	Core 26 composite	Whole	276.5	---	276.5
92-3254-C1		Whole	289	397.9	343.45
92-3255-C1		Whole	453.8	702.6	578.2
92-10669-C1	Core 27 composite	Whole	874	824	849
92-10669-C1		Whole	878	810	844
92-10670-C1		Whole	740	822	781
92-10670-C1		Whole	727	808	767.5

Table B2-46. Tank 241-B-201 Analytical Results: Silver (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-03239-A	26: 3	Lower ½	< 20.5	< 18.5	< 19.5
92-03238-A		Upper 1/2	< 19.6	< 20.9	< 20.3
92-03241-A	26: 7	Lower 1/2	< 20.7	< 17.9	< 19.3
92-03240-A		Upper 1/2	< 19.8	< 17.5	< 18.7
91-07661-A4B	27: 3	Lower 1/2	< 7.55	< 7.85	< 7.70
91-07661-A4B		Lower 1/2	< 18.9	< 19.6	< 19.3
91-07661-A4T		Upper 1/2	< 7.74	< 8.07	< 7.91
91-07661-A4T		Upper 1/2	< 19.4	< 20.2	< 19.8
91-07673-A4B	27: 6	Lower 1/2	9.00	9.00	9.00
91-07673-A4B		Lower 1/2	< 20.0	< 17.1	< 18.6
91-07673-A4T		Upper 1/2	< 19.3	< 20.3	< 19.8
91-07673-A4T		Upper 1/2	8.00	8.00	8.00
92-03254-A1	Core 26 composite	Whole	15.4	15.8	15.6
92-03254-A1		Whole	16.3	16.6	16.45
92-03255-A1		Whole	12.6	12.4	12.5
92-03255-A1		Whole	13.9	14.6	14.25
92-10670-A1	Core 27 composite	Whole	< 9.42	< 9.65	< 9.54
92-10669-A1		Whole	< 10.3	< 6.54	< 8.42
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 72.8	< 79.1	< 76.0
92-3254-H1		Whole	< 58.9	< 63.7	< 61.3
92-3255-H1		Whole	45.4	51.4	48.4
92-3255-H1		Whole	48.1	42.3	45.2
92-03251-H1B		Lower 1/2	< 40.4	< 38.3	< 39.4
92-03253-H1B		Lower 1/2	< 38.7	< 40.5	< 39.6
92-03250-HIT		Upper 1/2	< 37.4	< 39.8	< 38.6
92-03252-H1T		Upper 1/2	< 40.4	< 42.3	< 41.4
92-10669-H1	Core 27 composite	Whole	< 44.1	< 44.6	< 44.4
92-10670-H1		Whole	< 42.1	< 44.4	< 43.3
92-10669-H1B		Lower 1/2	< 41.8	< 42.9	< 42.4
92-10670-H1B		Lower 1/2	< 44.0	< 43.4	< 43.7
92-10669-H1T		Upper 1/2	< 43.4	< 39.7	< 41.6
92-10670-H1T		Upper 1/2	< 43.4	< 44.0	< 43.7

Table B2-46. Tank 241-B-201 Analytical Results: Silver (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 9.92	< 10.5	< 10.2
92-3254-C1		Whole	< 49.6	---	< 49.6
92-3255-C1		Whole	< 9.88	< 10.2	< 10.0
92-10669-C1	Core 27 composite	Whole	< 10.1	< 10.1	< 10.1
92-10669-C1		Whole	< 20.1	< 20.2	< 20.2
92-10670-C1		Whole	< 9.69	< 9.82	< 9.76
92-10670-C1		Whole	< 19.4	< 19.6	< 19.5

Table B2-47. Tank 241-B-201 Analytical Results: Sodium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	34,076.2	33,039.9	33,558.1
92-03238-A		Upper 1/2	36,031.4	39,457.2	37,744.3
92-03241-A	26: 7	Lower 1/2	32,626.9	31,698.8	32,162.8
92-03240-A		Upper 1/2	30,862	25,776.6	28,319.3
91-07661-A4B	27: 3	Lower 1/2	37,388	39,018	38,203
91-07661-A4B		Lower 1/2	37,441	38,869	38,155
91-07661-A4T		Upper 1/2	37,926	39,298	38,612
91-07661-A4T		Upper 1/2	38,448	39,524	38,986
91-07673-A4B	27: 6	Lower 1/2	32,520	31,449	31,984.5
91-07673-A4B		Lower 1/2	32,360	32,365	32,362.5
91-07673-A4T		Upper 1/2	30,224	30,310	30,267
91-07673-A4T		Upper 1/2	30,393	30,392	30,392.5
92-03254-A1	Core 26 composite	Whole	43,079.1	41,011.6	42,045.3
92-03254-A1		Whole	45,130.5	42,849.9	43,990.2
92-03255-A1		Whole	40,239.1	40,144.9	40,192
92-03255-A1		Whole	38,219.6	38,510.1	38,364.8
92-10670-A1	Core 27 composite	Whole	36,937	33,806	35,371.5
92-10669-A1		Whole	35,528	32,662	34,095

Table B2-47. Tank 241-B-201 Analytical Results: Sodium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	64,039.7	68,510	66,274.9
92-3255-H1		Whole	53,776.6	56,724.6	55,250.6
92-03251-H1B		Lower 1/2	42,228	40,453	41,340.5
92-03253-H1B		Lower 1/2	43,153	36,762	39,957.5
92-03250-HIT		Upper 1/2	41,843	43,726	42,784.5
92-03252-H1T		Upper 1/2	35,369	35,161	35,265
92-10669-H1	Core 27 composite	Whole	36,027	41,087	38,557
92-10670-H1		Whole	37,896	38,706	38,301
92-10669-H1B		Lower 1/2	33,627	34,470	34,048.5
92-10670-H1B		Lower 1/2	33,564	35,054	34,309
92-10669-H1T		Upper 1/2	33,711	41,449	37,580
92-10670-H1T		Upper 1/2	34,068	35,467	34,767.5
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	30,130.3	---	30,130.3
92-3254-C1		Whole	29,887.2	31,846	30,866.6
92-3255-C1		Whole	30,975.3	35,105.8	33,040.6
92-10669-C1	Core 27 composite	Whole	31,528	30,392	30,960
92-10669-C1		Whole	31,780	30,362	31,071
92-10670-C1		Whole	29,087	29,337	29,212
92-10670-C1		Whole	28,980	29,131	29,055.5

Table B2-48. Tank 241-B-201 Analytical Results: Strontium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	616	564.8	590.4
92-03238-A		Upper 1/2	611.4	693.3	652.35
92-03241-A	26: 7	Lower 1/2	1,139	1,148.4	1,143.7
92-03240-A		Upper 1/2	1,065.2	880.1	972.65
91-07661-A4B	27: 3	Lower 1/2	593	631	612
91-07661-A4B		Lower 1/2	594	628	611
91-07661-A4T		Upper 1/2	618	640	629
91-07661-A4T		Upper 1/2	627	642	634.5
91-07673-A4B	27: 6	Lower 1/2	1,296	1,232	1,264
91-07673-A4B		Lower 1/2	1,295	1,273	1,284
91-07673-A4T		Upper 1/2	1,223	1,211	1,217
91-07673-A4T		Upper 1/2	1,226	1,204	1,215
92-03254-A1	Core 26 composite	Whole	1,146.5	839.7	993.1
92-03254-A1		Whole	1,124.8	827.5	976.15
92-03255-A1		Whole	936.4	938.7	937.55
92-03255-A1		Whole	960.4	941.9	951.15
92-10670-A1	Core 27 composite	Whole	944	905	924.5
92-10669-A1		Whole	897	808	852.5
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	896.3	951.9	924.1
92-3254-H1		Whole	913.8	965.9	939.85
92-3255-H1		Whole	792	823.3	807.65
92-3255-H1		Whole	919.5	897.2	908.35
92-03251-H1B		Lower 1/2	901	948	924.5
92-03253-H1B		Lower 1/2	925	732	828.5
92-03250-HIT		Upper 1/2	945	995	970
92-03252-H1T		Upper 1/2	830	820	825
92-10669-H1	Core 27 composite	Whole	938	997	967.5
92-10670-H1		Whole	926	949	937.5
92-10669-H1B		Lower 1/2	863	902	882.5
92-10670-H1B		Lower 1/2	877	939	908
92-10669-H1T		Upper 1/2	830	1,021	925.5
92-10670-H1T		Upper 1/2	897	977	937

Table B2-48. Tank 241-B-201 Analytical Results: Strontium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 2.48	---	< 2.48
92-3254-C1		Whole	0.700	0.700	0.700
92-3255-C1		Whole	1.00	1.10	1.05
92-10669-C1	Core 27 composite	Whole	1.00	1.00	1.00
92-10669-C1		Whole	1.00	1.00	1.00
92-10670-C1		Whole	1.00	1.00	1.00
92-10670-C1		Whole	1.00	1.00	1.00

Table B2-49. Tank 241-B-201 Analytical Results: Tellurium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 205	< 185	< 195
92-03238-A		Upper 1/2	< 196	< 209	< 203
92-03241-A	26: 7	Lower 1/2	< 207	< 179	< 193
92-03240-A		Upper 1/2	< 198	< 175	< 187
91-07661-A4B	27: 3	Lower 1/2	< 75.5	< 78.5	< 77.0
91-07661-A4B		Lower 1/2	< 189	< 196	< 193
91-07661-A4T		Upper 1/2	< 77.4	< 80.7	< 79.1
91-07661-A4T		Upper 1/2	< 194	< 202	< 198
91-07673-A4B	27: 6	Lower 1/2	< 80.0	< 68.4	< 74.2
91-07673-A4B		Lower 1/2	< 200	< 171	< 186
91-07673-A4T		Upper 1/2	< 77.1	< 81.2	< 79.2
91-07673-A4T		Upper 1/2	< 193	< 203	< 198
92-03254-A1	Core 26 composite	Whole	< 20.3	< 20.3	< 20.3
92-03254-A1		Whole	< 102	< 102	< 102
92-03255-A1		Whole	< 20.1	< 18.6	< 19.4
92-03255-A1		Whole	< 100	< 92.9	< 96.5
92-10670-A1	Core 27 composite	Whole	< 94.2	< 96.5	< 95.4
92-10669-A1		Whole	< 103	< 65.4	< 84.2

Table B2-49. Tank 241-B-201 Analytical Results: Tellurium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 728	< 791	< 760
92-3254-H1		Whole	< 589	< 637	< 613
92-3255-H1		Whole	< 445	< 472	< 459
92-3255-H1		Whole	< 449	< 415	< 432
92-03251-H1B		Lower 1/2	< 404	< 383	< 394
92-03253-H1B		Lower 1/2	< 387	< 405	< 396
92-03250-HIT		Upper 1/2	< 374	< 398	< 386
92-03252-H1T		Upper 1/2	< 404	< 423	< 414
92-10669-H1	Core 27 composite	Whole	< 441	< 446	< 444
92-10670-H1		Whole	< 421	< 444	< 433
92-10669-H1B		Lower 1/2	< 418	< 429	< 424
92-10670-H1B		Lower 1/2	< 440	< 434	< 437
92-10669-H1T		Upper 1/2	< 434	< 397	< 416
92-10670-H1T		Upper 1/2	< 434	< 440	< 437
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 49.6	---	< 49.6
92-3254-C1		Whole	< 9.92	< 10.5	< 10.2
92-3255-C1		Whole	< 9.88	< 10.2	< 10.0
92-10669-C1	Core 27 composite	Whole	< 10.1	< 10.1	< 10.1
92-10669-C1		Whole	< 20.1	< 20.2	< 20.2
92-10670-C1		Whole	< 9.69	< 9.82	< 9.76
92-10670-C1		Whole	< 19.4	< 19.6	< 19.5

Table B2-50. Tank 241-B-201 Analytical Results: Thallium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-03239-A	26: 3	Lower 1/2	< 1,030	< 927	< 979
92-03238-A		Upper 1/2	< 982	< 1,040	< 1,010
92-03241-A	26: 7	Lower 1/2	< 1,030	< 896	< 963
92-03240-A		Upper 1/2	< 989	< 873	< 931
91-07661-A4B	27: 3	Lower 1/2	< 377	< 393	< 385
91-07661-A4B		Lower 1/2	< 944	< 982	< 963
91-07661-A4T		Upper 1/2	< 387	< 403	< 395
91-07661-A4T		Upper 1/2	< 968	< 1,010	< 989
91-07673-A4B	27: 6	Lower 1/2	< 400	< 342	< 371
91-07673-A4B		Lower 1/2	< 1,000	< 854	< 927
91-07673-A4T		Upper 1/2	< 386	< 406	< 396
91-07673-A4T		Upper 1/2	< 964	< 1,010	< 987
92-03254-A1	Core 26 composite	Whole	< 102	< 102	< 102
92-03254-A1		Whole	< 508	< 508	< 508
92-03255-A1		Whole	< 100	< 92.9	< 96.5
92-03255-A1		Whole	< 502	< 464	< 483
92-10670-A1	Core 27 composite	Whole	< 471	< 483	< 477
92-10669-A1		Whole	< 516	< 327	< 422
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 3,640	< 3,960	< 3,800
92-3254-H1		Whole	< 2,950	< 3,180	< 3,070
92-3255-H1		Whole	< 2,230	< 2,360	< 2,300
92-3255-H1		Whole	< 2,250	< 2,070	< 2,160
92-03251-H1B		Lower 1/2	< 2,020	< 1,920	< 1,970
92-03253-H1B		Lower 1/2	< 1,930	< 2,020	< 1,980
92-03250-HIT		Upper 1/2	< 1,870	< 1,990	< 1,930
92-03252-H1T		Upper 1/2	< 2,020	< 2,120	< 2,070
92-10669-H1	Core 27 composite	Whole	< 2,200	< 2,230	< 2,220
92-10670-H1		Whole	< 2,110	< 2,220	< 2,170
92-10669-H1B		Lower 1/2	< 2,090	< 2,150	< 2,120
92-10670-H1B		Lower 1/2	< 2,200	< 2,170	< 2,190
92-10669-H1T		Upper 1/2	< 2,170	< 1,990	< 2,080
92-10670-H1T		Upper 1/2	< 2,170	< 2,200	< 2,190

Table B2-50. Tank 241-B-201 Analytical Results: Thallium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			μg/g	μg/g	μg/g
92-3254-C1	Core 26 composite	Whole	< 248	---	< 248
92-3254-C1		Whole	< 49.6	< 52.3	< 51.0
92-3255-C1		Whole	< 49.4	< 50.9	< 50.2
92-10669-C1	Core 27 composite	Whole	< 50.4	< 50.6	< 50.5
92-10669-C1		Whole	< 101	< 101	< 101
92-10670-C1		Whole	< 48.5	< 49.1	< 48.8
92-10670-C1		Whole	< 96.9	< 98.2	< 97.6

Table B2-51. Tank 241-B-201 Analytical Results: Thorium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-03239-A	26: 3	Lower 1/2	< 1,640	< 1,480	< 1,560
92-03238-A		Upper 1/2	< 1,570	< 1,670	< 1,620
92-03241-A	26: 7	Lower 1/2	< 1,650	< 1,430	< 1,540
92-03240-A		Upper 1/2	< 1,580	< 1,400	< 1,490
91-07661-A4B	27: 3	Lower 1/2	< 604	< 628	< 616
91-07661-A4B		Lower 1/2	< 1,510	< 1,570	< 1,540
91-07661-A4T		Upper 1/2	< 619	< 645	< 632
91-07661-A4T		Upper 1/2	< 1,550	< 1,610	< 1,580
91-07673-A4B	27: 6	Lower 1/2	< 640	< 547	< 594
91-07673-A4B		Lower 1/2	< 1,600	< 1,370	< 1,490
91-07673-A4T		Upper 1/2	< 617	< 649	< 633
91-07673-A4T		Upper 1/2	< 1,540	< 1,620	< 1,580
92-03254-A1	Core 26 composite	Whole	< 162	< 163	< 163
92-03254-A1		Whole	< 812	< 813	< 813
92-03255-A1		Whole	< 161	< 149	< 155
92-03255-A1		Whole	< 804	< 743	< 774
92-10670-A1	Core 27 composite	Whole	< 753	< 772	< 763
92-10669-A1		Whole	< 826	< 523	< 675

Table B2-51. Tank 241-B-201 Analytical Results: Thorium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 5,830	< 6,330	< 6,080
92-3254-H1		Whole	< 4,710	< 5,090	< 4,900
92-3255-H1		Whole	< 3,560	< 3,770	< 3,670
92-3255-H1		Whole	< 3,590	< 3,320	< 3,460
92-03251-H1B		Lower 1/2	< 3,230	< 3,070	< 3,150
92-03253-H1B		Lower 1/2	< 3,090	< 3,240	< 3,170
92-03250-HIT		Upper 1/2	< 2,990	< 3,180	< 3,090
92-03252-H1T		Upper 1/2	< 3,230	< 3,380	< 3,310
92-10669-H1	Core 27 composite	Whole	< 3,530	< 3,570	< 3,550
92-10670-H1		Whole	< 3,370	< 3,550	< 3,460
92-10669-H1B		Lower 1/2	< 3,340	< 3,430	< 3,390
92-10670-H1B		Lower 1/2	< 3,520	< 3,470	< 3,500
92-10669-H1T		Upper 1/2	4,773	< 3,180	3,980
92-10670-H1T		Upper 1/2	< 3,470	< 3,520	< 3,500
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 79.4	< 83.6	< 81.5
92-3254-C1		Whole	< 397	---	< 397
92-3255-C1		Whole	< 79.0	< 81.4	< 80.2
92-10669-C1	Core 27 composite	Whole	< 80.6	< 80.9	< 80.8
92-10669-C1		Whole	< 161	< 162	< 162
92-10670-C1		Whole	< 77.5	< 78.6	< 78.1
92-10670-C1		Whole	< 155	< 157	< 156

Table B2-52. Tank 241-B-201 Analytical Results: Tin (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μg/g	μg/g	μg/g
92-03239-A	26: 3	Lower ½	< 1,640	< 1,480	< 1,560
92-03238-A		Upper 1/2	< 1,570	< 1,670	< 1,620
92-03241-A	26: 7	Lower 1/2	< 1,650	< 1,430	< 1,540
92-03240-A		Upper 1/2	< 1,580	< 1,400	< 1,490
91-07661-A4B	27: 3	Lower 1/2	< 604	< 628	< 616
91-07661-A4B		Lower 1/2	< 1,510	< 1,570	< 1,540
91-07661-A4T		Upper 1/2	< 619	< 645	< 632
91-07661-A4T		Upper 1/2	< 1,550	< 1,610	< 1,580
91-07673-A4B	27: 6	Lower 1/2	< 640	< 547	< 594
91-07673-A4B		Lower 1/2	< 1,600	< 1,370	< 1,490
91-07673-A4T		Upper 1/2	< 617	< 649	< 633
91-07673-A4T		Upper 1/2	< 1,540	< 1,620	< 1,580
92-03254-A1	Core 26 composite	Whole	175.7	< 163	< 169
92-03254-A1		Whole	< 812	< 813	< 813
92-03255-A1		Whole	< 161	< 155.4	< 158
92-03255-A1		Whole	< 804	< 743	< 774
92-10670-A1	Core 27 composite	Whole	< 753	< 772	< 763
92-10669-A1		Whole	< 826	< 523	< 675
Solids: fusion digest			μg/g	μg/g	μg/g
92-3254-H1	Core 26 composite	Whole	< 5,830	< 6,330	< 6,080
92-3254-H1		Whole	< 4,710	< 5,090	< 4,900
92-3255-H1		Whole	< 3,560	< 3,770	< 3,670
92-3255-H1		Whole	< 3,590	< 3,320	< 3,460
92-03251-H1B		Lower 1/2	< 3,230	< 3,070	< 3,150
92-03253-H1B		Lower 1/2	< 3,090	< 3,240	< 3,070
92-03250-HIT		Upper 1/2	< 2,990	< 3,180	< 3,090
92-03252-H1T		Upper 1/2	< 3,230	< 3,380	< 3,310
92-10669-H1	Core 27 composite	Whole	< 3,530	< 3,570	< 3,550
92-10670-H1		Whole	< 3,370	< 3,550	< 3,460
92-10669-H1B		Lower 1/2	< 3,340	< 3,430	< 3,390
92-10670-H1B		Lower 1/2	< 3,520	< 3,470	< 3,500
92-10669-H1T		Upper 1/2	< 3,470	< 3,180	< 3,330
92-10670-H1T		Upper 1/2	< 3,470	< 3,520	< 3,500

Table B2-52. Tank 241-B-201 Analytical Results: Tin (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 29.8	< 31.4	< 30.6
92-3254-C1		Whole	< 149	---	< 149
92-3255-C1		Whole	< 29.6	< 30.5	< 30.1
92-10669-C1	Core 27 composite	Whole	< 80.6	< 80.9	< 80.8
92-10669-C1		Whole	< 161	< 162	< 162
92-10670-C1		Whole	< 77.5	< 78.6	< 78.1
92-10670-C1		Whole	< 155	< 157	< 156

Table B2-53. Tank 241-B-201 Analytical Results: Titanium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	342.6	344.7	343.65
92-03238-A		Upper 1/2	335	343.2	339.1
92-03241-A	26: 7	Lower 1/2	19.2	19.5	19.35
92-03240-A		Upper 1/2	21.7	16.2	18.95
91-07661-A4B	27: 3	Lower 1/2	81	83	82
91-07661-A4B		Lower 1/2	81	84	82.5
91-07661-A4T		Upper 1/2	83	84	83.5
91-07661-A4T		Upper 1/2	84	85	84.5
91-07673-A4B	27: 6	Lower 1/2	11	11	11
91-07673-A4B		Lower 1/2	10	10	10
91-07673-A4T		Upper 1/2	10	< 10.1	10.1
91-07673-A4T		Upper 1/2	10	10	10
92-03254-A1	Core 26 composite	Whole	463.1	692.5	577.8
92-03254-A1		Whole	477.3	717.7	597.5
92-03255-A1		Whole	400.7	404.6	402.65
92-03255-A1		Whole	419.1	413.8	416.45
92-10670-A1	Core 27 composite	Whole	72	67	69.5
92-10669-A1		Whole	74	68	71

Table B2-53. Tank 241-B-201 Analytical Results: Titanium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	806.5	815	810.75
92-3254-H1		Whole	961.9	851.4	906.65
92-3255-H1		Whole	667.9	785.4	726.65
92-3255-H1		Whole	792.5	783.4	787.95
92-03251-H1B		Lower 1/2	1,100	1,087	1,093.5
92-03253-H1B		Lower 1/2	892	869	880.5
92-03250-HIT		Upper 1/2	925	971	948
92-03252-H1T		Upper 1/2	741	727	734
92-10669-H1	Core 27 composite	Whole	126	162	144
92-10670-H1		Whole	128	131	129.5
92-10669-H1B		Lower 1/2	134	137	135.5
92-10670-H1B		Lower 1/2	117	137	127
92-10669-H1T		Upper 1/2	133	136	134.5
92-10670-H1T		Upper 1/2	128	140	134
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-3254-C1	Core 26 composite	Whole	< 0.496	< 0.523	< 0.510
92-3254-C1		Whole	< 2.48	---	< 2.48
92-3255-C1		Whole	< 0.494	< 0.509	< 0.502
92-10669-C1	Core 27 composite	Whole	< 0.504	< 0.506	< 0.505
92-10669-C1		Whole	< 1.01	< 1.01	< 1.01
92-10670-C1		Whole	< 0.485	< 0.491	< 0.488
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976

Table B2-54. Tank 241-B-201 Analytical Results: Tungsten (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**µg/g**	**µg/g**	**µg/g**
92-03239-A	26: 3	Lower 1/2	< 164	< 148	< 156
92-03238-A		Upper 1/2	< 157	< 167	< 162
92-03241-A	26: 7	Lower 1/2	< 165	< 143	< 154
92-03240-A		Upper 1/2	< 158	< 140	< 149
91-07661-A4B	27: 3	Lower 1/2	< 60.4	< 62.8	< 61.6
91-07661-A4B		Lower 1/2	< 151	< 157	< 154
91-07661-A4T		Upper 1/2	< 61.9	< 64.5	< 63.2
91-07661-A4T		Upper 1/2	< 155	< 161	< 158
91-07673-A4B	27: 6	Lower 1/2	< 64.0	< 54.7	< 59.4
91-07673-A4B		Lower 1/2	< 160	< 137	< 149
91-07673-A4T		Upper 1/2	< 61.7	< 64.9	< 63.3
91-07673-A4T		Upper 1/2	< 154	< 162	< 158
92-03254-A1	Core 26 composite	Whole	18	< 16.3	17.2
92-03254-A1		Whole	< 81.2	81.3	81.3
92-03255-A1		Whole	< 16.1	< 14.9	< 15.5
92-03255-A1		Whole	< 80.4	< 74.3	< 77.4
92-10670-A1	Core 27 composite	Whole	< 75.3	< 77.2	< 76.3
92-10669-A1		Whole	< 82.6	< 52.3	< 67.5
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 582	< 633	< 608
92-3254-H1		Whole	< 471	< 509	< 490
92-3255-H1		Whole	< 356	< 377	< 367
92-3255-H1		Whole	< 359	< 332	< 346
92-03251-H1B		Lower 1/2	< 323	< 307	< 315
92-03253-H1B		Lower 1/2	< 309	< 324	< 317
92-03250-HIT		Upper 1/2	< 299	< 318	< 309
92-03252-H1T		Upper 1/2	< 323	< 338	< 331
92-10669-H1	Core 27 composite	Whole	< 352	< 357	< 355
92-10670-H1		Whole	< 337	< 355	< 346
92-10669-H1B		Lower 1/2	< 334	< 343	< 339
92-10670-H1B		Lower 1/2	< 352	< 347	< 350
92-10669-H1T		Upper 1/2	< 347	< 318	< 333
92-10670-H1T		Upper 1/2	< 347	< 352	< 350

Table B2-54. Tank 241-B-201 Analytical Results: Tungsten (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 7.94	< 8.36	< 8.15
92-3254-C1		Whole	< 39.7	---	< 39.7
92-3255-C1		Whole	< 7.90	< 8.14	< 8.02
92-10669-C1	Core 27 composite	Whole	< 8.06	< 8.09	< 8.08
92-10669-C1		Whole	< 16.1	< 16.2	< 16.2
92-10670-C1		Whole	< 7.52	< 7.86	< 7.69
92-10670-C1		Whole	< 15.5	< 15.7	< 15.6

Table B2-55. Tank 241-B-201 Analytical Results: Total Uranium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 2,050	< 1,850	< 1,950
92-03238-A		Upper 1/2	< 1,960	< 2,090	< 2,030
92-03241-A	26: 7	Lower 1/2	< 2,070	< 1,790	< 1,940
92-03240-A		Upper 1/2	< 1,980	< 1,750	< 1,870
91-07661-A4B	27: 3	Lower 1/2	< 755	856	810
91-07661-A4B		Lower 1/2	< 1,890	< 1,960	< 1,930
91-07661-A4T		Upper 1/2	< 1,940	< 2,020	< 1,980
91-07661-A4T		Upper 1/2	841	875	858
91-07673-A4B	27: 6	Lower 1/2	< 800	< 684	< 742
91-07673-A4B		Lower 1/2	< 2,000	< 1,710	< 1,860
91-07673-A4T		Upper 1/2	< 771	< 812	< 792
91-07673-A4T		Upper 1/2	< 1,930	< 2,030	< 1,980
92-03254-A1	Core 26 composite	Whole	759	651.8	705.4
92-03254-A1		Whole	< 1,020	< 1,020	< 1,020
92-03255-A1		Whole	< 1,000	< 929	< 965
92-03255-A1		Whole	474.2	534.8	504.5
92-10670-A1	Core 27 composite	Whole	< 942	< 965	< 954
92-10669-A1		Whole	< 1,030	< 654	< 842

Table B2-55. Tank 241-B-201 Analytical Results: Total Uranium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µg/g**	**µg/g**	**µg/g**
92-3254-H1	Core 26 composite	Whole	< 7,280	< 7,910	< 7,600
92-3254-H1		Whole	< 5,890	< 6,370	< 6,130
92-3255-H1		Whole	< 4,450	< 4,720	< 4,590
92-3255-H1		Whole	< 4,490	< 4,150	< 4,320
92-03251-H1B		Lower 1/2	< 4,040	< 3,830	< 3,940
92-03253-H1B		Lower 1/2	< 3,870	< 4,050	< 3,960
92-03250-HIT		Upper 1/2	< 3,740	< 3,980	< 3,860
92-03252-H1T		Upper 1/2	< 4,040	< 4,230	< 4,140
92-10669-H1	Core 27 composite	Whole	< 4,410	< 4,460	< 4,440
92-10670-H1		Whole	< 4,210	< 4,440	< 4,330
92-10669-H1B		Lower 1/2	< 4,180	< 4,290	< 4,240
92-10670-H1B		Lower 1/2	< 4,400	< 4,340	< 4,370
92-10669-H1T		Upper 1/2	< 4,340	< 3,970	< 4,160
92-10670-H1T		Upper 1/2	< 4,340	< 4,400	< 4,370
Solids: water digest			**µg/g**	**µg/g**	**µg/g**
92-3254-C1	Core 26 composite	Whole	< 99.2	< 104.5	< 102
92-3254-C1		Whole	< 496.1	---	< 496.1
92-3255-C1		Whole	< 98.8	< 101.8	< 100
92-10669-C1	Core 27 composite	Whole	< 102	< 101	< 102
92-10669-C1		Whole	< 201	< 202	< 202
92-10670-C1		Whole	< 96.9	< 98.2	< 97.6
92-10670-C1		Whole	< 194	< 196.4	< 195

Table B2-56. Tank 241-B-201 Analytical Results: Vanadium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 20.5	< 18.5	< 19.5
92-03238-A		Upper 1/2	< 19.6	< 20.9	< 20.3
92-03241-A	26: 7	Lower 1/2	< 20.7	< 17.9	< 19.3
92-03240-A		Upper 1/2	< 19.8	< 17.5	< 18.7
91-07661-A4B	27: 3	Lower 1/2	< 7.55	< 7.85	< 7.70
91-07661-A4B		Lower 1/2	< 18.9	< 19.6	< 19.3
91-07661-A4T		Upper 1/2	< 7.74	< 8.07	< 8.91
91-07661-A4T		Upper 1/2	< 19.4	< 20.2	< 19.8
91-07673-A4B	27: 6	Lower 1/2	< 8.00	8	8
91-07673-A4B		Lower 1/2	< 20.0	< 17.1	< 18.6
91-07673-A4T		Upper 1/2	< 7.71	< 8.12	< 7.92
91-07673-A4T		Upper 1/2	< 19.3	< 20.3	< 19.8
92-03254-A1	Core 26 composite	Whole	23	28.3	25.65
92-03254-A1		Whole	22.4	27.8	25.1
92-03255-A1		Whole	17.5	17.7	17.6
92-03255-A1		Whole	18.6	20.1	19.35
92-10670-A1	Core 27 composite	Whole	< 9.42	< 9.65	< 9.54
92-10669-A1		Whole	< 10.3	< 6.54	< 8.42
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 72.8	< 79.1	< 76.0
92-3254-H1		Whole	< 58.9	< 63.7	< 61.3
92-3255-H1		Whole	< 44.5	< 47.2	< 45.9
92-3255-H1		Whole	< 44.9	< 41.5	< 43.2
92-03251-H1B		Lower 1/2	46	49	47.5
92-03253-H1B		Lower 1/2	< 38.7	< 40.5	< 39.6
92-03250-HIT		Upper 1/2	40	45	42.5
92-03252-H1T		Upper 1/2	< 40.4	< 42.3	< 41.4
92-10669-H1	Core 27 composite	Whole	< 44.1	< 44.6	< 44.4
92-10670-H1		Whole	< 42.1	< 44.4	< 43.3
92-10669-H1B		Lower 1/2	< 41.8	< 42.9	< 42.4
92-10670-H1B		Lower 1/2	< 44.0	< 43.4	< 43.7
92-10669-H1T		Upper 1/2	< 43.4	< 39.7	< 41.6
92-10670-H1T		Upper 1/2	< 43.4	< 44.0	< 43.7

Table B2-56. Tank 241-B-201 Analytical Results: Vanadium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 0.992	< 1.05	< 1.02
92-3254-C1		Whole	< 4.96	---	< 4.96
92-3255-C1		Whole	< 0.988	< 1.02	< 1.00
92-10669-C1	Core 27 composite	Whole	< 1.01	< 1.01	< 1.01
92-10669-C1		Whole	< 2.01	< 2.02	< 2.02
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95

Table B2-57. Tank 241-B-201 Analytical Results: Yttrium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 20.5	< 18.5	< 19.5
92-03238-A		Upper 1/2	< 19.6	< 20.9	< 20.3
92-03241-A	26: 7	Lower 1/2	< 20.7	< 17.9	< 19.3
92-03240-A		Upper 1/2	< 19.8	< 17.5	< 18.7
91-07661-A4B	27: 3	Lower 1/2	< 7.55	< 7.85	< 7.70
91-07661-A4B		Lower 1/2	< 18.9	< 19.6	< 19.3
91-07661-A4T		Upper 1/2	< 7.74	< 8.07	< 8.91
91-07661-A4T		Upper 1/2	< 19.4	< 20.2	< 19.8
91-07673-A4B	27: 6	Lower 1/2	< 8.00	< 6.84	< 7.42
91-07673-A4B		Lower 1/2	< 20.0	< 17.1	< 18.6
91-07673-A4T		Upper 1/2	< 7.71	< 8.12	< 7.92
91-07673-A4T		Upper 1/2	< 19.3	< 20.3	< 19.8
92-03254-A1	Core 26 composite	Whole	3.9	4.7	4.3
92-03254-A1		Whole	< 10.2	< 10.2	< 10.2
92-03255-A1		Whole	< 10.5	< 9.29	< 9.90
92-03255-A1		Whole	2.9	3.3	3.1
92-10670-A1	Core 27 composite	Whole	< 9.42	< 9.65	< 9.54
92-10669-A1		Whole	< 10.3	< 6.54	< 8.42

Table B2-57. Tank 241-B-201 Analytical Results: Yttrium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 72.8	< 79.1	< 76.0
92-3254-H1		Whole	< 58.9	< 63.7	< 61.3
92-3255-H1		Whole	< 44.5	< 47.2	< 45.9
92-3255-H1		Whole	< 44.9	< 41.5	< 43.2
92-03251-H1B		Lower 1/2	< 40.4	< 38.3	< 39.4
92-03253-H1B		Lower 1/2	< 38.7	< 40.5	< 39.6
92-03250-HIT		Upper 1/2	< 37.4	< 39.8	< 38.6
92-03252-H1T		Upper 1/2	< 40.4	< 42.3	< 41.4
92-10669-H1	Core 27 composite	Whole	< 44.1	< 44.6	< 44.4
92-10670-H1		Whole	< 42.1	< 44.4	< 43.3
92-10669-H1B		Lower 1/2	< 41.8	< 42.9	< 42.4
92-10670-H1B		Lower 1/2	< 44.0	< 43.4	< 43.7
92-10669-H1T		Upper 1/2	< 43.4	< 39.7	< 41.6
92-10670-H1T		Upper 1/2	< 43.4	< 44.0	< 43.7
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 0.992	< 1.05	< 1.02
92-3254-C1		Whole	< 4.96	---	< 4.96
92-3255-C1		Whole	< 0.988	< 1.02	< 1.00
92-10669-C1	Core 27 composite	Whole	< 1.01	< 1.01	< 1.01
92-10669-C1		Whole	< 2.01	< 2.02	< 2.02
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95

Table B2-58. Tank 241-B-201 Analytical Results: Zinc (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	68.6	60.8	64.7
92-03238-A		Upper 1/2	66	70.6	68.3
92-03241-A	26: 7	Lower 1/2	< 41.4	< 37.8	< 39.6
92-03240-A		Upper 1/2	< 39.5	< 34.9	< 37.2
91-07661-A4B	27: 3	Lower 1/2	50	53	51.5
91-07661-A4B		Lower 1/2	54	53	53.5
91-07661-A4T		Upper 1/2	58	56	57
91-07661-A4T		Upper 1/2	52	53	52.5
91-07673-A4B	27: 6	Lower 1/2	21	29	25
91-07673-A4B		Lower 1/2	< 40	< 34.2	< 37.1
91-07673-A4T		Upper 1/2	< 38.6	< 40.6	< 39.6
91-07673-A4T		Upper 1/2	23	21	22
92-03254-A1	Core 26 composite	Whole	188.6	175.8	182.2
92-03254-A1		Whole	194.1	181.5	187.8
92-03255-A1		Whole	186.2	268.6	227.4
92-03255-A1		Whole	195.2	274.1	234.65
92-10670-A1	Core 27 composite	Whole	241	225	233
92-10669-A1		Whole	254	211	232.5
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	529.4	595.8	562.6
92-3254-H1		Whole	500.2	893.9	697.05
92-3255-H1		Whole	419	468.9	443.95
92-3255-H1		Whole	393.1	376.4	384.75
92-03251-H1B		Lower 1/2	179	188	183.5
92-03253-H1B		Lower 1/2	186	99	142.5
92-03250-HIT		Upper 1/2	222	188	205
92-03252-H1T		Upper 1/2	187	187	187
92-10669-H1	Core 27 composite	Whole	267	229	248
92-10670-H1		Whole	218	229	223.5
92-10669-H1B		Lower 1/2	212	237	224.5
92-10670-H1B		Lower 1/2	218	391	304.5
92-10669-H1T		Upper 1/2	240	300	270
92-10670-H1T		Upper 1/2	257	265	261

Table B2-58. Tank 241-B-201 Analytical Results: Zinc (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 1.98	< 2.09	< 20.4
92-3254-C1		Whole	< 9.92	---	< 9.92
92-3255-C1		Whole	< 1.98	< 2.04	< 2.01
92-10669-C1	Core 27 composite	Whole	< 2.01	< 2.02	< 2.02
92-10669-C1		Whole	< 4.03	< 4.04	< 4.04
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95
92-10670-C1		Whole	< 3.88	< 3.93	< 3.91

Table B2-59. Tank 241-B-201 Analytical Results: Zirconium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µg/g	µg/g	µg/g
92-03239-A	26: 3	Lower 1/2	< 20.5	< 18.5	< 19.5
92-03238-A		Upper 1/2	< 19.6	< 20.9	< 20.3
92-03241-A	26: 7	Lower 1/2	< 20.7	< 17.9	< 19.3
92-03240-A		Upper 1/2	< 19.8	< 17.5	< 18.7
91-07661-A4B	27: 3	Lower 1/2	< 7.55	< 7.85	< 7.70
91-07661-A4B		Lower 1/2	19	18	18.5
91-07661-A4T		Upper 1/2	19	18	18.5
91-07661-A4T		Upper 1/2	< 19.4	< 20.2	< 19.8
91-07673-A4B	27: 6	Lower 1/2	< 8.00	< 6.84	< 7.42
91-07673-A4B		Lower 1/2	< 20.0	< 17.1	< 18.6
91-07673-A4T		Upper 1/2	< 7.71	< 8.12	< 7.92
91-07673-A4T		Upper 1/2	< 19.3	< 20.3	< 19.8
92-03254-A1	Core 26 composite	Whole	13	12.8	12.9
92-03254-A1		Whole	14.5	14.4	14.45
92-03255-A1		Whole	8.7	9.3	9
92-03255-A1		Whole	< 10.0	< 9.29	< 9.65
92-10670-A1	Core 27 composite	Whole	< 9.42	< 9.65	< 9.54
92-10669-A1		Whole	< 10.3	< 6.54	< 8.42

Table B2-59. Tank 241-B-201 Analytical Results: Zirconium (ICP). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-3254-H1	Core 26 composite	Whole	< 72.8	< 79.1	< 76.0
92-3254-H1		Whole	62.4	77.7	70.05
92-3255-H1		Whole	56.2	52.3	54.25
92-3255-H1		Whole	< 44.9	< 41.5	< 43.2
92-03251-H1B		Lower 1/2	44	51	47.5
92-03253-H1B		Lower 1/2	< 38.7	< 40.5	< 39.6
92-03250-HIT		Upper 1/2	39	43	41
92-03252-H1T		Upper 1/2	< 40.4	< 42.3	< 41.4
92-10669-H1	Core 27 composite	Whole	< 44.1	< 44.6	< 44.4
92-10670-H1		Whole	< 42.1	< 44.4	< 43.3
92-10669-H1B		Lower 1/2	< 41.8	< 42.9	< 42.4
92-10670-H1B		Lower 1/2	< 44.0	< 43.4	< 43.7
92-10669-H1T		Upper 1/2	< 43.4	< 39.7	< 41.6
92-10670-H1T		Upper 1/2	43.4	< 44.0	43.7
Solids: water digest			µg/g	µg/g	µg/g
92-3254-C1	Core 26 composite	Whole	< 0.992	< 1.05	< 1.02
92-3254-C1		Whole	< 4.96	---	< 4.96
92-3255-C1		Whole	< 0.988	< 1.02	< 1.00
92-10669-C1	Core 27 composite	Whole	< 1.01	< 1.01	< 1.01
92-10669-C1		Whole	< 2.01	< 2.02	< 2.02
92-10670-C1		Whole	< 0.969	< 0.982	< 0.976
92-10670-C1		Whole	< 1.94	< 1.96	< 1.95

Table B2-60. Tank 241-B-201 Analytical Results: Hexavalent Chromium (Colorimetric).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03255-C1	Core 26 composite	Whole	780	920	850
92-03256-C1		Whole	710	770	740
92-10669-C1	Core 27 composite	Whole	735	692	713.5
92-10670-C1		Whole	683	687	685

Table B2-61. Tank 241-B-201 Analytical Results: Total Uranium (Laser Fluorimetry).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µg/g	µg/g	µg/g
92-03254-H1	Core 26 composite	Whole	0.0763	0.085	0.08065
92-03255-H1		Whole	0.0652	0.0702	0.0677
92-10669-H1	Core 27 composite	Whole	289	321	305
92-10670-H1		Whole	312	323	317.5

Table B2-62. Tank 241-B-201 Analytical Results: Chloride (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03254-C1	Core 26 composite	Whole	1,700	1,800	1,750
92-03255-C1		Whole	1,800	2,000	1,900
92-10669-C1	Core 27 composite	Whole	1,600	1,500	1,550
92-10670-C1		Whole	1,500	1,500	1,500

Table B2-63. Tank 241-B-201 Analytical Results: Cyanide (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03254-C1	Core 26 composite	Whole	5	5	5
92-03255-C1		Whole	3.7	4.2	3.95
92-10669-C1	Core 27 composite	Whole	< 3	< 3	< 3
92-10670-C1		Whole	< 2	< 2	< 2

Table B2-64. Tank 241-B-201 Analytical Results: Fluoride (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03254-C1	Core 26 composite	Whole	5,200	5,900	5,550
92-03255-C1		Whole	6,100	7,200	6,650
92-10669-C1	Core 27 composite	Whole	6,300	5,900	6,100
92-10670-C1		Whole	5,600	5,800	5,700

Table B2-65. Tank 241-B-201 Analytical Results: Nitrate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03254-C1	Core 26 composite	Whole	47,000	50,000	48,500
92-03255-C1		Whole	51,000	59,000	55,000
92-10669-C1	Core 27 composite	Whole	51,000	49,000	50,000
92-10670-C1		Whole	48,000	49,000	48,500

Table B2-66. Tank 241-B-201 Analytical Results: Nitrite (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03254-C1	Core 26 composite	Whole	900	1,000	950
92-03255-C1		Whole	1,000	1,100	1,050
92-10669-C1	Core 27 composite	Whole	800	800	800
92-10670-C1		Whole	720	730	725

Table B2-67. Tank 241-B-201 Analytical Results: Phosphate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03254-C1	Core 26 composite	Whole	1,000	1,100	1,050
92-03255-C1		Whole	1,000	1,300	1,150
92-10669-C1	Core 27 composite	Whole	1,400	1,400	1,400
92-10670-C1		Whole	1,360	1,420	1,390

Table B2-68. Tank 241-B-201 Analytical Results: Sulfate (IC).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03254-C1	Core 26 composite	Whole	< 500	< 500	< 500
92-03255-C1		Whole	< 500	< 500	< 500
92-10669-C1	Core 27 composite	Whole	200	200	200
92-10670-C1		Whole	190	190	190

Table B2-69. Tank 241-B-201 Analytical Results: Ammonia (Ion Selective Electrode).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			μg/g	μg/g	μg/g
92-03254-C1	Core 26 composite	Whole	27	18	22.5
92-03255-C1		Whole	7	9	8
92-10669-C1	Core 27 composite	Whole	7	5.5	6.25
92-10670-C1		Whole	< 5	< 5	< 5

Table B2-70. Tank 241-B-201 Analytical Results: Extractable Organic Halides.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			μg/g	μg/g	μg/g
92-03254-F1	Core 26 composite	Whole	150	110	130
92-03255-F1		Whole	150	110	130
92-10669-F1	Core 27 composite	Whole	< 10	< 10	< 10
92-10670-F1		Whole	< 10	< 10	< 10

Table B2-71. Tank 241-B-201 Analytical Data for Nondetected Semivolatile Organics. (2 sheets)

Analyte	Highest Result (μg/g)	Analyte	Highest Result (μg/g)
1,2,4-Trichlorobenzene	< 89	Benzo(b)fluoranthene	< 89
1,2-Dichlorobenzene	< 89	Benzo(ghi)perylene	< 89
1,3-Dichlorobenzene	< 89	Benzo(k)fluoranthene	< 89
1,4-Dichlorobenzene	< 89	Benzoid acid	< 450
2,4,5-Trichlorophenol	< 450	Benzyl alcohol	< 89
2,4,6-Trichlorophenol	< 89	Bis(2-chloroethoxy)methane	< 89
2,4-Dichlorophenol	< 89	Bis(2-chloroisopropyl) ether	< 89
2,4-Dimethylphenol	< 89	Bis(2-chloroethyl) ether	< 89

Table B2-71. Tank 241-B-201 Analytical Data for Nondetected Semivolatile Organics. (2 sheets)

Analyte	Highest Result (μg/g)	Analyte	Highest Result (μg/g)
2,4-Dinitrophenol	< 450	Butylbenzylphthalate	< 89
2,4-Dinitrotoluene	< 89	Chrysene	< 89
2,6-Dinitrotoluene	< 89	Di-n-butylphthalate	< 89
2-Chloronaphthalene	< 89	Di-n-octylphthalate	< 89
2-Chlorophenal	< 89	Dibenz[a,h]anthracene	< 89
2-Methylnaphthalene	< 89	Dibenzofuran	< 89
2-Methylphenol	< 89	Diethylphthalate	< 89
2-Nitroaniline	< 450	Dimethylphthalate	< 89
2-Nitrophenol	< 89	Fluoranthene	< 89
3,3-Dichlorobenzidine	< 180	Fluorene	< 89
3-Nitroaniline	< 450	Hexachlorobenzene	< 89
4,6-Dinitro-o-cresol	< 450	Hexachlorobutadiene	< 89
4-Bromophenylphenyl ether	< 89	Hexachlorocyclopentadiene	< 89
4-Chloro-3-methylphenol	< 89	Hexachloroethane	< 89
4-Chloroaniline	< 89	Indeno(1,2,3-cd)pyrene	< 89
4-Chlorophenylphenyl ether	< 89	Isophorone	< 89
4-Methylphenol	< 89	N-Nitroso-di-n-dipropylamine	< 89
4-Nitroaniline	< 450	N-Nitrosodiohenylamine	< 89
4-Nitrophenol	< 450	Naphthalene	< 89
Acenaphthene	< 89	Nitrobezene	< 89
Acenaphthylene	< 89	Pentachlorophenol	< 450
Anthracene	< 89	Phenanthrene	< 89
Benzo(a)anthrcene	< 89	Phenol	< 89
Benzo(a)pyrene	< 89	Pyrene	< 89

Table B2-72. Tank 241-B-201 Analytical Results:
2,6-Bis(1,1-dimethylethyl)-4-methylphenol. (SVOA)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			μg/g	μg/g	μg/g
92-03254-E1	Core 26 composite	Whole	130	40	85
92-03255-E1		Whole	84	100	92

Table B2-73. Tank 241-B-201 Analytical Results: Bis(2-ethylhexyl) phthalate (SVOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			μg/g	μg/g	μg/g
92-03254-E1	Core 26 composite	Whole	8.5	9.7	9.1
92-03255-E1		Whole	11	11	11
92-10669-E1	Core 27 composite	Whole	< 18	< 2.7	< 10.35
92-10670-E1		Whole	1.8	1.8	1.8

Table B2-74. Tank 241-B-201 Analytical Results: Dodecane (SVOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			μg/g	μg/g	μg/g
92-03254-E1	Core 26 composite	Whole	290	180	235
92-03255-E1		Whole	320	350	335
92-10669-E1	Core 27 composite	Whole	290	230	260
92-10670-E1		Whole	330	290	310

Table B2-75. Tank 241-B-201 Analytical Results: Hexadecanoic Acid Ester (SVOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			$\mu g/g$	$\mu g/g$	$\mu g/g$
92-03255-E1	Core 26 composite	Whole	34.6	---	34.6

Table B2-76. Tank 241-B-201 Analytical Results: Pentadecane (SVOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			$\mu g/g$	$\mu g/g$	$\mu g/g$
92-03254-E1	Core 26 composite	Whole	52	44	48
92-03255-E1		Whole	60	68	64
92-10669-E1	Core 27 composite	Whole	25	22	23.5
92-10670-E1		Whole	31	26	28.5

Table B2-77. Tank 241-B-201 Analytical Results:
Phosphoric acid, dioctadecylester. (SVOA)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			$\mu g/g$	$\mu g/g$	$\mu g/g$
92-03254-E1	Core 26 composite	Whole	48	48	48
92-03255-E1		Whole	64	64	64

Table B2-78. Tank 241-B-201 Analytical Results: Tetradecane (SVOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µg/g	µg/g	µg/g
92-03254-E1	Core 26 composite	Whole	1,300	1,000	1,150
92-03255-E1		Whole	1,400	1,600	1,500
92-10669-E1	Core 27 composite	Whole	720	650	685
92-10670-E1		Whole	840	740	790

Table B2-79. Tank 241-B-201 Analytical Results: Tridecane (SVOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µg/g	µg/g	µg/g
92-03254-E1	Core 26 composite	Whole	960	640	800
92-03255-E1		Whole	1,000	1,200	1,100
92-10669-E1	Core 27 composite	Whole	920	790	855
92-10670-E1		Whole	1,000	920	960

Table B2-80. Tank 241-B-201 Analytical Data for Nondetected Volatile Organics.

Analyte	Highest Result (μg/g)	Analyte	Highest Result (μg/g)
1,1,1-Trichloroethane	< 3.8	Chlorobenzene	< 3.8
1,1,2,2-Tetrachloroethane	< 3.8	Chloroethane	< 7.7
1,1,2-Trichloroethane	< 3.8	Chloroform	< 3.8
1,1-Dichloroethane	< 3.8	Chloromethane	< 7.7
1,1-Dichloroehene	< 3.8	Dibromochloromethane	< 3.8
1,2-Dichloroethane	< 3.8	Ethylbenzene	< 3.8
1,2-Dichloroethylene	< 3.8	Hexone	< 7.7
1,2-Dichloropropane	< 3.8	Methylenechloride	< 3.8
2-Hexanone	< 7.7	Styrene	< 3.8
2-butanone	< 7.7	Tetrachloroethene	< 3.8
Acetone	< 7.7	Trichloroethene	< 3.8
Benzene	< 3.8	Vinyl acetate	< 7.7
Bromodichloromethane	< 3.8	Vinyl chloride	< 7.7
Bromoform	< 3.8	Xylenes (total)	< 3.8
Bromomethane	< 7.7	cis-1,3-Dichloropropene	< 3.8
Carbon disulfide	< 3.8	trans-1,3-Dichloropropene	< 3.8
Carbon tetrachloride	< 3.8		

Table B2-81. Tank 241-B-201 Analytical Results: 1,1,2-Trichloro-1,2,2-trifluoroethane. (VOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µg/g	µg/g	µg/g
91-07350	26: 1	Whole	6	---	6

Table B2-82. Tank 241-B-201 Analytical Results: Hexamethyl Disiloxane (VOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µg/g	µg/g	µg/g
91-07350	26: 1	Whole	---	15	15
91-07358	26: 3	Whole	39	24	31.5
91-07374	26: 7	Whole	14	18	16

Table B2-83. Tank 241-B-201 Analytical Results: Methoxytrimethyl Silane (VOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µg/g	µg/g	µg/g
91-07350	26: 1	Whole	145	91	118
91-07358	26: 3	Whole	238	175	206.5
91-07374	26: 7	Whole	106	105	105.5

Table B2-84. Tank 241-B-201 Analytical Results: Toluene (VOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µg/g	µg/g	µg/g
91-07350	26: 1	Whole	6.6	7.8	7.2
91-07358	26: 3	Whole	5.4	4.3	4.85
91-07374	26: 7	Whole	3.2	3.2	3.2

Table B2-85. Tank 241-B-201 Analytical Results: Trimethyl Silanol (VOA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µg/g	µg/g	µg/g
91-07350	26: 1	Whole	50	129	89.5
91-07358	26: 3	Whole	245	168	206.5
91-07374	26: 7	Whole	112	86	99

Table B2-86. Tank 241-B-201 Analytical Results: Total Carbon (Persulfate Oxidation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: direct			µg/g	µg/g	µg/g
92-03255-J1	Core 26 composite	Whole	9,100	7,900	8,500
92-03254-K1		Whole	8,100	8,500	8,300
92-10669-J1	Core 27 composite	Whole	3,010	3,010	3,010
92-10670-J1		Whole	2,490	2,580	2,535

Table B2-87. Tank 241-B-201 Analytical Results: Total Carbon (Persulfate Oxidation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03255-C1	Core 26 composite	Whole	3,110	4,820	3,970
92-03254-C1		Whole	2,650	2,630	2,640
92-10669-C1	Core 27 composite	Whole	2,400	2,100	2,250
92-10670-C1		Whole	2,200	2,300	2,250

Table B2-88. Tank 241-B-201 Analytical Results: Total Organic Carbon (Persulfate Oxidation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: direct			µg/g	µg/g	µg/g
92-03255-J1	Core 26 composite	Whole	5,000	4,000	4,500
92-03254-K1		Whole	3,200	4,200	3,700
92-10669-J1	Core 27 composite	Whole	600	760	680
92-10670-J1		Whole	490	660	575

Table B2-89. Tank 241-B-201 Analytical Results: Total Organic Carbon (Persulfate Oxidation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			µg/g	µg/g	µg/g
92-03255-C1	Core 26 composite	Whole	630	1,900	1,270
92-03254-C1		Whole	470	470	470
92-10669-C1	Core 27 composite	Whole	600	600	600
92-10670-C1		Whole	500	300	400

Table B2-90. Tank 241-B-201 Analytical Results: Total Inorganic Carbon.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: direct			µg/g	µg/g	µg/g
92-03255-J1	Core 26 composite	Whole	4,100	3,900	4,000
92-03254-K1		Whole	4,900	4,300	4,600
92-10669-J1	Core 27 composite	Whole	2,350	2,250	2,300
92-10670-J1		Whole	2,000	1,920	1,960

Table B2-91. Tank 241-B-201 Analytical Results: Total Inorganic Carbon.

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			μg/g	μg/g	μg/g
92-03254-C1	Core 26 composite	Whole	2,180	2,160	2,170
92-03255-C1		Whole	2,480	2,920	2,700
92-10669-C1	Core 27 composite	Whole	1,800	1,500	1,650
92-10670-C2		Whole	1,700	2,000	1,850

Table B2-92. Tank 241-B-201 Analytical Results: Total Alpha (Alpha Proportional Counting).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			μCi/g	μCi/g	μCi/g
92-03254-H1	Core 26 composite	Whole	1.01	1.18	1.095
92-03255-H1		Whole	0.982	1.11	1.046
92-10669-H1	Core 27 composite	Whole	1.52	1.57	1.545
92-10670-H1		Whole	1.53	1.58	1.555
Solids: water digest			μCi/g	μCi/g	μCi/g
92-03254-C1	Core 26 composite	Whole	6.260E-04	5.140E-04	5.700E-04
92-03255-C1		Whole	2.400E-04	5.040E-04	3.720E-04

Table B2-93. Tank 241-B-201 Analytical Results: Total Alpha Pu (Alpha Proportional Counting).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			μCi/g	μCi/g	μCi/g
92-10669-H1	Core 27 composite	Whole	1.4	1.56	1.48
92-10670-H1		Whole	1.44	1.5	1.47

Table B2-94. Tank 241-B-201 Analytical Results: Neptunium-237 (Alpha Proportional Counting/AEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			μCi/g	μCi/g	μCi/g
92-03254-H1	Core 26 composite	Whole	< 5.000E-05	< 6.000E-05	< 5.500E-05
92-03255-H1		Whole	< 4.000E-05	< 4.000E-05	< 4.000E-05
92-10669-H1	Core 27 composite	Whole	< 2.000E-04	< 2.000E-04	< 2.000E-04
92-10670-H1		Whole	< 2.000E-04	< 2.000E-04	< 2.000E-04

Table B2-95. Tank 241-B-201 Analytical Results: Americium-241 (Alpha Proportional Counting/AEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			μCi/g	μCi/g	μCi/g
92-03254-H1	Core 26 composite	Whole	0.0264	0.0334	0.0299
92-03255-H1		Whole	0.0309	0.0266	0.02875
92-10669-H1	Core 27 composite	Whole	0.0282	0.0313	0.02975
92-10670-H1		Whole	0.0242	0.0286	0.0264

Table B2-96. Tank 241-B-201 Analytical Results: Curium-243/244 (Alpha Proportional Counting/AEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			μCi/g	μCi/g	μCi/g
92-03254-H1	Core 26 composite	Whole	0.00123	0.00261	0.00192
92-03255-H1		Whole	0.00114	0.00157	0.001355

Table B2-97. Tank 241-B-201 Analytical Results: Pu-238 (Alpha Proportional Counting/AEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µCi/g**	**µCi/g**	**µCi/g**
92-03254-H1	Core 26 composite	Whole	0.00671	0.00689	0.0068
92-03255-H1		Whole	0.00797	0.00604	0.007005

Table B2-98. Tank 241-B-201 Analytical Results: Pu-239/40 (Alpha Proportional Counting/AEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**µCi/g**	**µCi/g**	**µCi/g**
92-03254-H1	Core 26 composite	Whole	0.766	0.838	0.802
92-03255-H1		Whole	0.667	0.905	0.786

Table B2-99. Tank 241-B-201 Analytical Results: Pu-238 to Pu ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**%**	**%**	**%**
92-03254-H1	Core 26 composite	Whole	0.003	0.006	0.0045
92-03255-H1		Whole	0.005	0.005	0.005
92-10669-H1	Core 27 composite	Whole	0.008	0.002	0.005
92-10670-H1		Whole	0.003	0.007	0.005

Table B2-100. Tank 241-B-201 Analytical Results: Pu-239 to Pu ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			%	%	%
92-03254-H1	Core 26 composite	Whole	98.405	98.419	98.412
92-03255-H1		Whole	98.368	98.426	98.397
92-10669-H1	Core 27 composite	Whole	98.3753	98.4728	98.424
92-10670-H1		Whole	98.4681	98.4462	98.4572

Table B2-101. Tank 241-B-201 Analytical Results: Pu-240 to Pu ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			%	%	%
92-03254-H1	Core 26 composite	Whole	1.569	1.557	1.563
92-03255-H1		Whole	1.588	1.556	1.572
92-10669-H1	Core 27 composite	Whole	1.5946	1.518	1.5563
92-10670-H1		Whole	1.5214	1.5278	1.5246

Table B2-102. Tank 241-B-102 Analytical Results: Pu-241 to Pu ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			%	%	%
92-03254-H1	Core 26 composite	Whole	0.014	0.012	0.013
92-03255-H1		Whole	0.023	0.009	0.016
92-10669-H1	Core 27 composite	Whole	0.017	0.006	0.0115
92-10670-H1		Whole	0.006	0.017	0.0115

Table B2-103. Tank 241-B-201 Analytical Results: Pu-242 to Pu ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			%	%	%
92-03254-H1	Core 26 composite	Whole	0.008	0.007	0.0075
92-03255-H1		Whole	0.017	0.003	0.01
92-10669-H1	Core 27 composite	Whole	0.005	0.001	0.003
92-10670-H1		Whole	0.001	0.002	0.0015

Table B2-104. Tank 241-B-201 Analytical Results: U234 to U ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			%	%	%
92-03254-H1	Core 26 composite	Whole	0.0053	0.0057	0.0055
92-03255-H1		Whole	0.0039	0.0063	0.0051
92-10669-H1	Core 27 composite	Whole	0.007	0.005	0.006
92-10670-H1		Whole	0.005	0.005	0.005

Table B2-105. Tank 241-B-201 Analytical Results: U235 to U ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			%	%	%
92-03254-H1	Core 26 composite	Whole	0.6904	0.6877	0.68905
92-03255-H1		Whole	0.6858	0.5825	0.63415
92-10669-H1	Core 27 composite	Whole	0.6938	0.6936	0.6937
92-10670-H1		Whole	0.6952	0.6946	0.6949

Table B2-106. Tank 241-B-201 Analytical Results: U236 to U ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			%	%	%
92-03254-H1	Core 26 composite	Whole	0.0047	0.0062	0.00545
92-03255-H1		Whole	0.0038	0.0049	0.00435
92-10669-H1	Core 27 composite	Whole	0.006	0.005	0.0055
92-10670-H1		Whole	0.006	0.005	0.0055

Table B2-107. Tank 241-B-201 Analytical Results: U238 to U ratio (Mass Spec.).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			%	%	%
92-03254-H1	Core 26 composite	Whole	99.2996	99.3004	99.3
92-03255-H1		Whole	99.3066	99.3063	99.3064
92-10669-H1	Core 27 composite	Whole	99.2932	99.2957	99.2944
92-10670-H1		Whole	99.2936	99.2957	99.2946

Table B2-108. Tank 241-B-201 Analytical Results: ^{90}Sr (Beta Proportional Counting).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			μCi/g	μCi/g	μCi/g
92-03254-H1	Core 26 composite	Whole	3.87	5.18	4.525
92-03255-H1		Whole	2.76	2.22	2.49
92-10669-H1	Core 27 composite	Whole	1.04	1.33	1.185
92-10670-H1		Whole	0.94	0.83	0.885

Table B2-109. Tank 241-B-201 Analytical Results: Technetium-99 (Beta Proportional Counting).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µCi/g	µCi/g	µCi/g
92-03254-H1	Core 26 composite	Whole	< 0.0021	< 0.0023	< 0.0022
92-03255-H1		Whole	< 0.0016	< 0.0015	< 0.00155
92-10669-H1	Core 27 composite	Whole	< 0.002	< 0.002	< 0.002
92-10670-H1		Whole	< 0.002	< 0.002	< 0.002

Table B2-110. Tank 241-B-201 Analytical Results: Total Beta (Beta Proportional Counting).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µCi/g	µCi/g	µCi/g
92-03254-H1	Core 26 composite	Whole	8.87	0.115	4.4925
92-03255-H1		Whole	7.24	6.32	6.78
92-10669-H1	Core 27 composite	Whole	3.35	2.91	3.13
92-10670-H1		Whole	3.35	3.11	3.23
Solids: water digest			µCi/g	µCi/g	µCi/g
92-03254-C1	Core 26 composite	Whole	0.0444	0.0455	0.04495
92-03255-C1		Whole	0.0599	0.064	0.06195

Table B2-111. Tank 241-B-201 Analytical Results: Americium-241 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µCi/g	µCi/g	µCi/g
92-03239-A	26: 3	Lower 1/2	0.0148	0.0145	0.01465
92-03238-A		Upper 1/2	0.0151	0.0229	0.019
92-03241-A	26: 7	Lower 1/2	0.0577	0.0519	0.0548
92-03240-A		Upper 1/2	0.0516	0.0507	0.05115
91-7661-A1B	27: 3	Lower 1/2	0.0159	0.017	0.01645
91-7661-A1B		Lower 1/2	0.0146	0.0143	0.01445
91-7661-A1T		Upper 1/2	0.0161	0.0189	0.0175
91-7661-A1T		Upper 1/2	0.0178	0.0197	0.01875
91-7673-A1B	27: 6	Lower 1/2	0.0263	0.0255	0.0259
91-7673-A1B		Lower 1/2	0.0281	0.0254	0.02675
91-7673-A1T		Upper 1/2	0.0267	0.0261	0.0264
91-7673-A1T		Upper 1/2	0.0299	0.0269	0.0284
Solids: fusion digest			µCi/g	µCi/g	µCi/g
92-03254-H1	Core 26 composite	Whole	0.031	0.0374	0.0342
92-03255-H1		Whole	0.031	0.0256	0.0283
92-03251-H1B		Lower 1/2	0.031	0.0306	0.0308
92-03253-H1B		Lower 1/2	0.0334	0.023	0.0282
92-03250-H1T		Upper 1/2	0.035	0.0382	0.0366
92-03252-H1T		Upper 1/2	0.0361	0.0298	0.03295
92-10669-H1	Core 27 composite	Whole	0.0298	0.0341	0.03195
92-10670-H1		Whole	0.0289	0.0304	0.02965
92-10669-H1B		Lower 1/2	0.0276	0.0332	0.0304
92-10670-H1B		Lower 1/2	0.0292	0.0503	0.03975
92-10669-H1T		Upper 1/2	0.0763	0.0651	0.0707
92-10670-H1T		Upper 1/2	0.0276	0.0532	0.0404
Solids			µCi/g	µCi/g	µCi/g
92-10669-T	Core 27 composite	Upper 1/2	0.0257	---	0.0257
92-10670-T		Upper 1/2	0.0201	---	0.0201
92-10669-B		Lower 1/2	0.0232	---	0.0232
92-10670-B		Lower 1/2	0.0394	---	0.0394

Table B2-112. Tank 241-B-201 Analytical Results: Cerium-144 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µCi/g	µCi/g	µCi/g
92-03238-A	26: 3	Upper 1/2	---	0.00923	0.00923
Solids: fusion digest			µCi/g	µCi/g	µCi/g
92-10670-H1	Core 27 composite	Whole	0.0127	---	0.0127
Solids			µCi/g	µCi/g	µCi/g
92-10669-T	Core 27 composite	Upper 1/2	< 0.02	---	< 0.02
92-10670-T		Upper 1/2	0.00659	---	0.00659
92-10669-B		Lower 1/2	< 0.0068	---	< 0.0068
92-10670-B		Lower 1/2	0.0180	---	0.0180

Table B2-113. Tank 241-B-201 Analytical Results: Cesium-134 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µCi/g	µCi/g	µCi/g
92-03239-A	26: 3	Lower 1/2	0.00111	0.00105	0.00108
92-03238-A		Upper 1/2	0.00188	0.00323	0.002555
92-03241-A	26: 7	Lower 1/2	0.00242	8.800E-04	0.00165
92-03240-A		Upper 1/2	---	7.28E-04	7.28E-04
91-7661-A4B	27: 3	Lower 1/2	< 0.0015	0.00272	< 0.00211
91-7661-A4T		Upper 1/2	< 0.0015	< 0.0015	< 0.0015
91-7673-A4B	27: 6	Lower 1/2	< 0.0015	< 8.000E-04	< 0.00115
91-7673-A4T		Upper 1/2	< 0.0015	< 0.002	< 0.00175
Solids: fusion digest			µCi/g	µCi/g	µCi/g
92-03254-H1	Core 26 composite	Whole	0.00312	---	0.00312
92-03255-H1		Whole	0.00224	0.00179	0.002015
92-03253-H1B		Lower 1/2	0.00199	---	0.00199
Solids: water digest			µCi/g	µCi/g	µCi/g
92-03255-C1	Core 26 composite	Whole	---	2.480E-04	2.480E-04

Table B2-114. Tank 241-B-201 Analytical Results: Cesium-137 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**μCi/g**	**μCi/g**	**μCi/g**
92-03239-A	26: 3	Lower 1/2	0.194	0.156	0.175
92-03238-A		Upper 1/2	0.325	0.361	0.343
92-03241-A	26: 7	Lower 1/2	0.118	0.066	0.092
92-03240-A		Upper 1/2	0.0661	0.0689	0.0675
91-7661-A1B	27: 3	Lower 1/2	0.122	0.118	0.12
91-7661-A1B		Lower 1/2	0.2	0.333	0.2665
91-7661-A1T		Upper 1/2	0.169	0.184	0.1765
91-7661-A1T		Upper 1/2	0.268	0.237	0.2525
91-7673-A1B	27: 6	Lower 1/2	0.0706	0.0356	0.0531
91-7673-A1B		Lower 1/2	0.0268	0.0415	0.03415
91-7673-A1T		Upper 1/2	0.0419	0.0285	0.0352
91-7673-A1T		Upper 1/2	0.0953	0.877	0.48615
Solids: fusion digest			**μCi/g**	**μCi/g**	**μCi/g**
92-03254-H1	Core 26 composite	Whole	0.99	1.61	1.3
92-03255-H1		Whole	0.616	0.853	0.7345
92-03251-H1B		Lower 1/2	0.516	2.02	1.268
92-03253-H1B		Lower 1/2	0.946	0.476	0.711
92-03250-H1T		Upper 1/2	0.492	1.37	0.931
92-03252-H1T		Upper 1/2	0.622	0.735	0.6785
92-10669-H1	Core 27 composite	Whole	0.463	0.826	0.6445
92-10670-H1		Whole	0.453	0.59	0.5215
92-10669-H1B		Lower 1/2	0.46	16.8	8.63
92-10670-H1B		Lower 1/2	0.4	23.3	11.85
92-10669-H1T		Upper 1/2	155	46.1	100.55
92-10670-H1T		Upper 1/2	0.853	72.2	36.5265
Solids: water digest			**μCi/g**	**μCi/g**	**μCi/g**
92-03254-C1	Core 26 composite	Whole	0.0392	0.0407	0.03995
92-03255-C1		Whole	0.0513	0.0563	0.0538

Table B2-114. Tank 241-B-201 Analytical Results: Cesium-137 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			μCi/g	μCi/g	μCi/g
92-10669-T	Core 27 composite	Upper 1/2	0.805	---	0.805
92-10670-T		Upper 1/2	0.157	---	0.157
92-10669-B		Lower 1/2	0.198	---	0.198
92-10670-B		Lower 1/2	0.195	---	0.195

Table B2-115. Tank 241-B-201 Analytical Results: Cobalt-60 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			μCi/g	μCi/g	μCi/g
92-03239-A	26: 3	Lower 1/2	0.00271	0.00416	0.003435
92-03238-A		Upper 1/2	0.00242	0.00742	0.00492
92-03241-A	26: 7	Lower 1/2	0.00256	0.00146	0.00201
92-03240-A		Upper 1/2	0.0015	0.00116	0.00133
91-7661-A1B	27: 3	Lower 1/2	8.580E-04	< 0.0015	< 0.001179
91-7661-A1B		Lower 1/2	---	0.00252	0.00252
91-7661-A1T		Upper 1/2	0.00235	---	0.00235
91-7661-A1T		Upper 1/2	0.00112	< 0.0015	< 0.00131
91-7673-A1B	27: 6	Lower 1/2	< 0.0015	< 7.500E-04	< 0.001125
91-7673-A1T		Upper 1/2	< 0.0015	< 0.0015	< 0.0015
Solids: fusion digest			μCi/g	μCi/g	μCi/g
92-03254-H1	Core 26 composite	Whole	0.00292	0.00859	0.005755
92-03255-H1		Whole	0.00293	0.00445	0.00369
92-03251-H1B		Lower 1/2	< 6.600E-04	0.134	< 0.06733
92-03253-H1B		Lower 1/2	0.0147	< 6.600E-04	< 0.00768
92-03252-H1T		Upper 1/2	< 5.600E-04	4.210E-04	< 4.905E-04
92-03250-H1T		Upper 1/2	< 6.900E-04	9.600E-04	< 8.250E-04

Table B2-115. Tank 241-B-201 Analytical Results: Cobalt-60 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**μCi/g**	**μCi/g**	**μCi/g**
92-10669-H1	Core 27 composite	Whole	< 4.500E-04	3.900E-04	< 4.200E-04
92-10670-H1		Whole	< 5.800E-04	< 5.800E-04	< 5.800E-04
92-10670-H1B		Lower 1/2	---	0.0335	0.0335
92-10669-H1T		Upper 1/2	0.215	0.0646	0.1398
92-10670-H1T		Upper 1/2	---	0.106	0.106
Solids			**μCi/g**	**μCi/g**	**μCi/g**
92-10669-T	Core 27 composite	Upper 1/2	4.980E-04	---	4.980E-04
92-10670-T		Upper 1/2	0.001	---	0.001
92-10669-B		Lower 1/2	3.31E-04	---	3.31E-04
92-10670-B		Lower 1/2	< 8.2E-04	---	< 8.2E-04

Table B2-116. Tank 241-B-201 Analytical Results: Europium-154 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			**μCi/g**	**μCi/g**	**μCi/g**
92-03239-A	26: 3	Lower 1/2	0.0041	0.0045	0.0043
92-03238-A		Upper 1/2	0.00609	0.00794	0.007015
92-03241-A	26: 7	Lower 1/2	0.0026	---	0.0026
91-7661-A1B	27: 3	Lower 1/2	---	0.00134	0.00134
91-7661-A1B		Lower 1/2	< 0.0035	0.00255	< 0.003025
91-7661-A1T		Lower 1/2	---	0.00151	0.00151
91-7661-A1T		Upper 1/2	< 0.0035	< 0.003	< 0.00325
91-7673-A1B	27: 6	Lower 1/2	< 0.002	< 0.002	< 0.002
91-7673-A1T		Upper 1/2	< 0.002	< 0.003	< 0.0025

Table B2-116. Tank 241-B-201 Analytical Results: Europium-154 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µCi/g	µCi/g	µCi/g
92-03254-H1	Core 26 composite	Whole	0.00767	0.00875	0.00821
92-03255-H1		Whole	0.00543	0.00456	0.004995
92-03251-H1B		Lower 1/2	0.0068	0.00618	0.00649
92-03253-H1B		Lower 1/2	0.0076	0.00502	0.00631
92-03250-H1T		Upper 1/2	0.00587	0.00635	0.00611
92-03252-H1T		Upper 1/2	0.00743	0.00833	0.00788
92-10669-H1	Core 27 composite	Whole	0.00289	0.00215	0.00252
92-10670-H1		Whole	< 0.0018	< 0.0018	< 0.0018
92-10670-H1B		Lower 1/2	---	0.110	0.110
92-10670-H1T		Lower 1/2	---	0.333	0.333
92-10669-H1T		Upper 1/2	0.715	0.233	0.474
Solids			µCi/g	µCi/g	µCi/g
92-10669-T	Core 27 composite	Upper 1/2	0.00347	---	0.00347
92-10670-T		Upper 1/2	0.00206	---	0.00206
92-10669-B		Lower 1/2	0.00432	---	0.00432
92-10670-B		Lower 1/2	0.0144	---	0.0144

Table B2-117. Tank 241-B-201 Analytical Results: Europium-155 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: acid digest			µCi/g	µCi/g	µCi/g
92-03239-A	26: 3	Lower 1/2	0.00563	0.00357	0.0046
92-03238-A		Upper 1/2	0.00516	0.00703	0.006095
91-7661-A1B	27: 3	Lower 1/2	< 0.0035	< 0.004	< 0.00375
91-7661-A1T		Upper 1/2	< 0.004	< 0.004	< 0.004
91-7673-A1B	27: 6	Lower 1/2	< 0.0025	< 0.002	< 0.00225
91-7673-A1T		Upper 1/2	< 0.0025	< 0.0045	< 0.0035

Table B2-117. Tank 241-B-201 Analytical Results: Europium-155 (GEA). (2 sheets)

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µCi/g	µCi/g	µCi/g
92-03255-H1	Core 26 composite	Whole	---	0.00470	0.00470
92-03253-H1B		Lower 1/2	0.00483	0.00419	0.00451
92-03251-H1B		Lower 1/2	0.00427	0.00558	0.004925
92-03250-H1T		Upper 1/2	0.00501	0.00531	0.00516
92-03252-H1T		Upper 1/2	0.00524	0.00557	0.005405
92-10669-H1	Core 27 composite	Whole	< 0.0027	< 0.0034	< 0.00305
92-10670-H3		Whole	< 0.0027	< 0.0029	< 0.0028
Solids			µCi/g	µCi/g	µCi/g
92-10670-B	Core 27 composite	Lower 1/2	0.00681	---	0.00681

Table B2-118. Tank 241-B-201 Analytical Results: Potassium-40 (GEA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			µCi/g	µCi/g	µCi/g
92-03251-H1B	Core 26 composite	Lower 1/2	0.00359	0.00733	0.00546
92-03253-H1B		Lower 1/2	< 0.00124	0.003	0.00212
92-03250-H1T		Upper 1/2	0.00364	0.00717	0.005405
92-03252-H1T		Upper 1/2	< 0.0039	0.00355	0.003725
Solids: water digest			µCi/g	µCi/g	µCi/g
92-03254-C1	Core 26 composite	Whole	---	0.00138	0.00138
92-03255-C1		Whole	0.0011	---	0.0011

Table B2-119. Tank 241-B-201 Analytical Results: Selenium-79 (Liq. Scintillation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: fusion digest			**μCi/g**	**μCi/g**	**μCi/g**
92-03254-H1	Core 26 composite	Whole	< 5E-05	< 6E-05	< 6E-05
92-03255-H1		Whole	< 4E-05	< 4E-05	< 4E-05
92-10669-H1	Core 27 composite	Whole	2.73E-04	< 4E-05	1.57E-04
92-10670-H1		Whole	< 4E-05	< 4E-05	< 4E-05

Table B2-120. Tank 241-B-201 Analytical Results: Tritium (Liq. Scintillation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids: water digest			**μCi/g**	**μCi/g**	**μCi/g**
92-03254-C1	Core 26 composite	Whole	0.0289	0.0309	0.0299
92-03255-C1		Whole	0.113	0.0434	0.0782
92-10669-C1	Core 27 composite	Whole	0.00472	0.00753	0.006125
92-10670-C1		Whole	0.0028	0.00264	0.00272

Table B2-121. Tank 241-B-201 Analytical Results: Carbon-14 (Liq. Scintillation).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			**μCi/g**	**μCi/g**	**μCi/g**
92-03254-K1	Core 26 composite	Whole	< 0.001	< 6.00E-04	< 8.00E-04
92-03255-J1		Whole	< 3.00E-04	< 5.00E-04	< 4.00E-04
92-10669-J1	Core 27 composite	Whole	< 3.00E-05	< 3.00E-05	< 3.00E-05
92-10670-J1		Whole	< 3.00E-05	3.70E-05	3.35E-05

Table B2-122. Tank 241-B-201 Analytical Results: Nickel-59 (Ni).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µCi/g	µCi/g	µCi/g
92-03254-H1	Core 26 composite	Whole	< 1.1E-05	< 6.7E-06	< 8.9E-06
92-03255-H1		Whole	< 8E-06	< 7.8E-06	< 7.9E-06
92-10669-B1	Core 27 composite	Whole	4.8E-06	< 3.8E-06	4.3E-06
92-10670-B1		Whole	< 5.4E-06	7.4E-06	6.4E-06

Table B2-123. Tank 241-B-201 Analytical Results: Nickel-63 (Ni).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			µCi/g	µCi/g	µCi/g
92-03254-H1	Core 26 composite	Whole	1.630E-04	2.830E-04	2.230E-04
92-03255-H1		Whole	1.120E-04	1.230E-04	1.175E-04
92-10669-B1	Core 27 composite	Whole	5.64E-05	4.320E-04	2.440E-04
92-10670-B1		Whole	4.75E-05	2.870E-04	1.675E-04

Table B2-124. Tank 241-B-201 Analytical Results: Density (Physical Properties).

Sample Location	Sample Portion	Result	Duplicate	Mean
Solids		g/mL	g/mL	g/mL
26: 1	Whole	1.3	---	1.3
26: 2	Whole	1.4	---	1.4
26: 3	Whole	1.2	---	1.2
26: 4	Whole	1.2	---	1.2
26: 5	Whole	1.2	---	1.2
26: 6	Whole	1.3	---	1.3
26: 7	Whole	1.3	---	1.3
26: 8	Whole	1.3	---	1.3
27: 1	Whole	1.2	---	1.2
27: 2	Whole	1.2	---	1.2
27: 3	Whole	1.2	---	1.2
27: 4	Whole	1.2	---	1.2
27: 5	Whole	1.3	---	1.3
27: 6	Whole	1.3	---	1.3
27: 7	Whole	1.2	---	1.2
27: 8	Whole	1.3	---	1.3

Table B2-125. Tank 241-B-201 Analytical Results: Density (Physical Properties).

Sample Location	Sample Portion	Result	Duplicate	Mean
Liquids		g/mL	g/mL	g/mL
26: 1	Whole	1	---	1

Table B2-126. Tank 241-B-201 Analytical Results: Summary of Core 26 Physical Measurements.

Analyte	Units	Segments		
		2	5	8
Segment - As Received				
Volume % settled solids	%	100	100	100
Density	g/mL	1.65	1.51	1.34
Volume % centrifuged solids	%	98	98	88
Weight % centrifuged solids	%	98	98	90
Centrifuged supernate density	g/mL	1.19	1.19	1.05
Centrifuged solids density	g/mL	1.66	1.52	1.37
Segment - 1:1 Water to Sample Dilution				
Volume % settled solids	%	83	81	92
Density	g/mL	1.33	1.17	1.13
Volume % centrifuged solids	%	58	43	42
Weight % centrifuged solids	%	69	52	49
Centrifuged supernate density	g/mL	1.01	1.00	0.99
Centrifuged solids density	g/mL	1.59	1.40	1.33
Segment - 3:1 Water to Sample Dilution				
Volume % settled solids	%	42	37	57
Density	g/mL	1.10	1.05	1.05
Volume % centrifuged solids	%	24	16	21
Weight % centrifuged solids	%	32	21	25
Centrifuged supernate density	g/mL	0.99	1.00	0.99
Centrifuged solids density	g/mL	1.48	1.36	1.24

Table B2-127. Tank 241-B-201 Analytical Results: Weight Percent Solids (Gravimetric).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			%	%	%
91-07350	26: 1	Whole	49.8	53.6	51.7
Not provided	26: 2	Whole	52	55.2	53.6
91-07358	26: 3	Whole	29.9	29.1	29.5
Not provided	26: 4	Whole	31	28.6	29.8
Not provided	26: 5	Whole	31.3	32	31.65
Not provided	26: 6	Whole	33.8	33.3	33.55
91-07374	26: 7	Whole	29.6	28.2	28.9
Not provided	26: 8	Whole	28.5	27.6	28.05
(See table note)	Core 26 composite	Whole	37.2	37	37.1
		Whole	42.4	41.2	41.8
		Whole	38.3	34.2	36.25
		Whole	42.2	41.7	41.95

Note:

The following sample numbers were designated for the core 26 composites: 92-03254-L1 and 92-03255-K1. However, documentation was not provided in Pool (1994) as to which sample numbers matched each primary/duplicate pair.

Table B2-128. Tank 241-B-201 Analytical Results: Weight Percent Solids (TGA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			%	%	%
91-07654	27: 1	Whole	32.3	34.6	33.45
91-07652	27: 2	Whole	25.3	31.4	28.35
91-07662	27: 3	Whole	99.2	94.2	96.7
91-07666	27: 4	Whole	45.8	39.8	42.8
91-07674	27: 5	Whole	47.1	46.6	46.85
91-07674	27: 6	Whole	68.1	64.6	66.35
91-07678	27: 7	Whole	80.6	84.5	82.55
91-07678	27: 8	Whole	64.7	71.9	68.3

Table B2-129. Tank 241-B-201 Analytical Results: Power Law Curve Fit Parameters of 1:1 Dilution Samples.

Segment	Temp. (°C)	Run	Yield Point (Pa)	Consistency Factor (Pa sec)	Flow Behavior Index
2	30	1	1.16	0.00651	0.92
		2	2.29	0.0161	0.81
5	30	2	4.77	0.00889	1.00
		3	6.38	0.0234	0.85
8	29	1	9.53	0.0282	0.86
		2	6.60	0.0666	0.73

Table B2-130. Tank 241-B-201 Analytical Results: Flow Properties of 1:1 Dilution Samples.

Segment	Temp (°C)	Run	Pipe (in.)	Critical Velocity (ft/sec)	Critical Flow Rate (gal/min)	Critical Reynolds Number
2	30	1	2	1.9	19	8,500
			3	1.7	38	10,800
		2	2	2.6	27	8,100
			3	2.3	54	9,900
5	30	1	2	4.1	43	8,600
			3	3.6	84	11,300
		2	2	4.7	49	8,100
			3	4.2	97	10,000
8	30	1	2	5.9	61	8,000
			3	5.3	122	9,900
		2	2	5.4	57	6,100
			3	4.9	113	7,200

Table B2-131. Tank 241-B-201 Analytical Results: Shear Strength (Physical Properties).

Sample Location	Sample Portion	Result	Duplicate	Mean
Solids		dynes/cm^2	dynes/cm^2	dynes/cm^2
26: 2	Whole	14,100	---	14,100
26: 5	Whole	13,100	---	13,100
26: 8	Whole	12,200	---	12,200

Table B2-132. Tank 241-B-201 Analytical Results: Particle Size Distribution for Core 27.

Sample Number	Segment	Particle Size, μm (by number)		Particle Size, μm (by volume)	
		Mean	Median	Mean	Median
91-07654	1	1.13	0.88	26.37	19.98
91-07658	2	1.31	0.91	65.55	46.62
91-07662	3	1.48	0.92	30.47	21.63
91-07666	4	1.07	0.84	18.02	12.08
91-07670	5	1.16	0.87	9.42	6.46
91-07674	6	1.56	1.03	41.79	37.49
91-07678	7	1.24	0.93	18.65	17.45
91-07682	8	1.10	0.86	23.24	17.65

Table B2-133. Tank 241-B-201 Analytical Results: Weight Loss Percent (TGA).

Sample Number	Sample Location	Sample Portion	Result	Duplicate	Mean
Solids			%	%	%
91-07654	27: 1	Whole	67.7	65.4	66.55
91-07652	27: 2	Whole	74.7	68.6	71.65
91-07662	27: 3	Whole	0.8	5.8	3.3
91-07666	27: 4	Whole	54.2	60.2	57.2
91-07674	27: 5	Whole	52.9	53.4	53.15
91-07674	27: 6	Whole	31.9	35.4	33.65
91-07678	27: 7	Whole	19.4	15.5	17.45
91-07678	27: 8	Whole	35.3	28.1	31.7

Table B2-134. Tank 241-B-201 Analytical Results: Core 27 Differential Scanning Calorimetry Measurements.

Sample Number	Seg.	Run	Transition 1			Transition 2		
			ΔH (J/g)	Onset (°C)	Range (°C)	ΔH (J/g)	Onset (°C)	Range (°C)
91-07654	1	1	1,180	64	36-132	71.1	140	132-211
		2	1,280	64	34-140	62.7	146	140-217
91-07658	2	1	> 1,210	73	34-141	418	166	141-340
		2	> 1,330	73	34-137	314	150	137-302
91-07662	3[1]	1	Not observed			16.7	123	106-153
		2	Not observed			No analysis		
91-01666	4	1	1,130	64	36-125	41.8	137	125-191
		2	1,140	61	34-125	25.1	130	125-176
91-07670	5	1	1,020	69	37-139	83.6	152	139-235
		2	1,080	63	34-135	33.4	141	135-194
91-07674	6	1	836	63	37-147	33.4	153	147-210
		2	920	60	37-183	Not observed		
91-07678	7	1	623	51	37-146	Not observed		
		2	502	41	34-117	Not observed		
91-07682	8	1	811	47	35-128	Not observed		
		2	857	55	37-158	Not observed		

Notes:

Seg. = segment
ΔH = change in enthalpy

[1]A third transition was observed in this sample with a ΔH of 29.3 J/g and an onset temperature of 249 °C (480 °F). The temperature range for this transition was 215 °C (419 °F) to 400 °C (752 °F).

B2.9 HISTORICAL SAMPLE RESULTS

Table B2-135 contains the analytical results from the core sample taken from tank 241-B-201 in 1978. These analytical results are similar to the 1978 analytical results from the other three 210 kL (55 kgal) tanks in the B Tank Farm. The data have not been validated and should be used with caution.

Table B2-135. Historical Core Sample Analytical Data for Tank 241-B-201. (2 sheets)

Analyte	Water Soluble	Acid (Fusion)
Al	0.05%	1.0%
Bi^{3+}	<0.005%	3.8%
CO_3^{2-}	3.3%	nr
CrO_4^-	0.05%	nr
Cl^-	0.01%	nr
Fe	<0.0002%	1.8%
Hg	0.05%	nr
K	0.3%	nr
La^{3+}	<0.003%	1.3%
Mn	<0.003%	nr
Ni^{2+}	---	0.1%
NO_2^-	0.004%	nr
NO_3^-	3.3%	nr
Na^+	2.8%	nr
OH^-	0.6%	nr
PO_4^{3-}	0.05%	1.1%
SO_4^{2-}	<0.1%	<0.6%
SiO_2^{2-}	0.05%	0.3%
U	7.41E-06 g/g	1.05E-05 g/g
Pu	<1.29E-10 g/g	5.00E-05 g/g
Am	5.69E-12 g/g	1.33E-09 g/g

Table B2-135. Historical Core Sample Analytical Data for Tank 241-B-201. (2 sheets)

Analyte	Water Soluble	Acid (Fusion)
$^{89+90}Sr^{2+}$	0.00210 μCi/g	2.70 μCi/g
$^{137}Cs^{+}$	0.05 μCi/g	0.059 μCi/g
^{155}Eu	nr	0.028 μCi/g
Ce	nr	0.016 μCi/g
Analyte	**Direct**	
Water solubility	23.0%	
Bulk density	1.37 g/mL	
Percent water	72.2%	

Note:
nr = not reported

B3.0 ASSESSMENT OF CHARACTERIZATION RESULTS

This section discusses the overall quality and consistency of the current sampling results for tank 241-B-201 and to provide the results of the calculation of an analytical-based inventory.

This section also evaluates sampling and analysis factors that may impact data interpretation. These factors are used to assess data overall quality and consistency and to identify limitations in data use.

B3.1 FIELD OBSERVATIONS

No problems were noted during the sampling event which would impact the analytical results. Recoveries were good for all segments. Although segment 1 of core 26 had a 65 percent recovery, only 70 percent was expected. The sampling would meet the current safety screening DQO sampling requirements. Two core samples were taken from opposite sides of the tank, and both obtained vertical profiles of the waste.

B3.2 HOMOGENIZATION TESTS

Sample homogenization is an important step in making representative core composite samples. The following two homogenization steps were used for core samples from tank 241-B-201: segments from each core were homogenized; then homogenized waste from each segment was assembled and homogenized to create core composite samples. Samples were taken from the top and bottom of two segments per core (segments 3 and 7 from core 26 and segments 3 and 6 from core 27) and from the top and bottom of each core composite sample. Analytical results from the samples were used to determine whether the sample homogenization was adequate. Segment level samples were prepared by acid digestion and chemically analyzed using ICP and GEA. The composite level samples were prepared using KOH/Ni fusion and chemically analyzed using ICP and GEA. It should be noted that homogenization test data were not used in determining the analytical means.

The analytical results from the top and bottom segment and composite samples (homogenization samples) were fit to the following nested random effects model:

$$Y_{ijk} = \mu + C_i + S_{ij} + H_{ijk} + E_{ijkl}$$

where:

Y_{ijk}	=	The measured value of concentration of a constituent in segment *j* of core *i*
μ	=	The mean concentration of the constituent
C_i	=	The core sampled
S_{ij}	=	The segment or composite sample from a core
H_{ijk}	=	The location on the composite or segment (homogenization effect)
E_{ijkl}	=	The analytical error.

The objective of the homogenization test was to determine whether the variability in the results between sampling locations is greater than zero. This objective was met using the results from an analysis of variance (ANOVA) on the random effects model.

The results from an ANOVA are shown in Table B3-1. The homogenization relative standard deviation (RSD) (estimated variability between locations relative to the mean) is given with the p-value from the homogenization tests. Analytes with more than 75 percent of the analytical results below the detection limits were excluded from this analysis.

Table B3-1. Homogenization Test Results. (2 sheets)

Composite Level Homogenization Tests (KOH/Ni Fusion ICP and GEA)									
	Homogenization		Obs.			Homogenization		Obs.	
Analyte	RSD (%)	p-value[1]	<DL	#	Analyte	RSD (%)	p-value[1]	<DL	#
Al	14	0.001	0	16	Ba	12	0.203	0	16
Bi	0	0.875	0	16	Ca	12	0.000	0	16
Cr	0	0.799	0	16	Co	0	0.474	10	16
Cu	32	0.201	0	16	Fe	9	0.030	0	16
La	0	0.954	0	16	Pb	0	0.818	0	16
Mg	11	0.005	0	16	Mn	0	0.945	0	16
P	0	0.708	0	16	Si	13	0.035	0	16
Na	3	0.344	0	16	Sr	0	0.925	0	16
Ti	14	0.000	0	16	V	4	0.472	12	16
Zn	0	0.676	0	16	Zr	5	0.472	12	16
^{241}Am	28	0.029	0	16	^{134}Cs	n/a	n/a	0	2
^{137}Cs	93	0.181	0	16	^{60}Co	0	0.651	4	12
^{154}Eu	0	0.787	0	12	^{155}Eu	n/a	n/a	0	8
^{40}K	n/a	n/a	2	8					
Segment Level Homogenization Tests (Acid Digestion ICP and GEA)									
	Homogenization					Homogenization			
Analyte	RSD (%)	p-value[1]	<DL	Obs	Analyte	RSD (%)	p-value[1]	<DL	Obs
Al	3	0.001	0	24	Ba	3	0.154	0	24
Bi	8	0.003	0	24	B	0	0.909	0	24
Ca	2	0.217	0	24	Cr	5	0.015	0	24
Cu	7	0.006	7	24	Fe	3	0.072	0	24
La	7	0.002	0	24	Pb	4	0.151	4	24
Mg	0	0.775	0	24	Mn	0	0.997	0	24

Table B3-1. Homogenization Test Results. (2 sheets)

Segment Level Homogenization Tests (Acid Digestion ICP and GEA)									
	Homogenization					Homogenization			
Analyte	RSD (%)	p-value[1]	<DL	Obs	Analyte	RSD (%)	p-value[1]	<DL	Obs
P	4	0.029	0	24	Ni	5	0.011	0	24
K	1	0.305	3	24	Si	0	0.428	0	24
Na	6	0.003	0	24	Sr	7	0.003	0	24
Ti	1	0.177	1	24	Zn	0	0.939	7	24
^{241}Am	6	0.070	0	24	^{134}Cs	14	0.217	7	15
^{137}Cs	29	0.486	0	24	^{60}Co	0	0.790	6	18
^{154}Eu	26	0.094	7	15	^{155}Eu	8	0.369	8	12

Notes:

DL = detection limit
n/a = not applicable
Obs = observations

[1]p-value < 0.05 indicates a significant RSD.

The homogenization tests on the composite level show that for 83 percent of the analytes tested, the variability caused by homogenization cannot be distinguished from zero (99 percent significance level). That is, the homogenization on the composite level is sufficient for 83 percent of the analytes tested. However, the core 26 report (Pool 1994) indicates that many sample and duplicate relative percent differences (RPDs) are large (that is, 10 to 30 percent for core composites, versus less than 10 percent at the segment level). These large RPDs may reduce the validity of the statement made above (Heasler et al. 1994).

Typical RPDs of 10 to 20 percent for many duplicate pairs are marginally acceptable; however, these high homogenization RPDs potentially compromise the accuracy of the full suite of characterization analyses performed on the core composite samples. That is, the accuracy of any "single" analysis is biased by the inability to obtain a truly representative sampling from the blended composite samples (Heasler et al. 1994).

The homogenization tests on the segment level show that for 77 percent of the analytes tested, the variability caused by homogenization cannot be distinguished from zero (99 percent significance level). For the other 23 percent of the analytes, the homogenization RSDs are relatively small (that is, less than 10 percent). Although variability caused by homogenization is greater than zero (because of small analytical error), the variability is small enough to consider the homogenization adequate. The core 26 report (Pool 1994) indicates large RPDs (significantly higher than normal) for several duplicate analyses, indicating insufficient homogenization, substantial sample heterogeneity, or inadequate subsampling. Generally for both segments from core 26, the bottom samples have higher concentrations of most analytes than the top samples. This may be caused by settling before subsampling. Because of small homogenization RSDs, the large analytical error from large RPDs does not affect conclusions about the homogenization as much as for the composite samples. In general, the homogenization on the segment level is considered adequate.

B3.3 QUALITY CONTROL ASSESSMENT

The usual quality control assessment includes an evaluation of the appropriate standard recoveries, spike recoveries, duplicate analyses, and blanks that are performed in conjunction with the chemical analyses. The quality control criteria were established by Winters et al. (1990). Heasler et al. (1994) specifically discussed spikes and blanks; that discussion is reproduced here. Standard recovery and duplicate analysis quality control violations are discussed in the data validation summary in Section B3.3.4.

B3.3.1 Evaluation of Spikes and Blanks

Of the 7,598 observations in the tank 241-B-201 database, 2,480 are some form of spike or blank measurement run for quality control purposes. A brief overview of these measurements is provided in this section. More detailed evaluations of the spikes and blanks are in Pool (1994).

The evaluation of blanks uncovered a problem with the ICP fusion measurements on core 26. The blanks for many constituents were sometimes 50 percent of the measured value. When the blank results were compared to homogenization measurements on the same sample, it became apparent that the contamination being measured by the blanks was real.

Table B3-2 illustrates this problem. If the homogenization measurements are compared to the primary/duplicate results, the values differ by approximately 58 percent, significantly more than the sample and duplicate replicates differ (approximately 5 percent). However, if the blanks are subtracted first, the agreement is dramatically better (11 percent).

Table B3-2. Contamination Problem for ICP Fusion on Core 26.[1,2]

Constituent	Analytical Result			Homogenization Measure			Adjusted Measure	
	Sample	Duplicate	Blank	Sample	Duplicate	Blank	Sample	Duplicate
Al	12,324	13,071	6,115	6,940	7,183	<DL	6,209	6,956
B	14,946	16,567	15,342	<DL	<DL	<DL	<DL	<DL
Ca	20,207	20,674	4,065	19,055	19,537	<DL	16,142	16,609
Na	64,039	68,510	26,897	41,843	43,726	<DL	37,142	41,613
Si	55,255	59,723	24,351	29,634	30,620	<DL	30,904	35,372

Notes:

[1]Extracted from Tables 2-1a and 2-1c of core reports (Pool 1994).

[2]Values in table are for composite sample 1.

It is obvious these measurements must be corrected for blank contamination; therefore, blanks were subtracted from the ICP fusion measurements. There are indications that other corrections might be needed. Because it has been the policy to make no corrections for other tanks at Hanford, corrections were limited to the ICP fusions for tank 241-B-201 (Heasler et al. 1994). The data tables in Section B2.0 do not reflect the corrected data.

B3.3.2 Blank Measurements

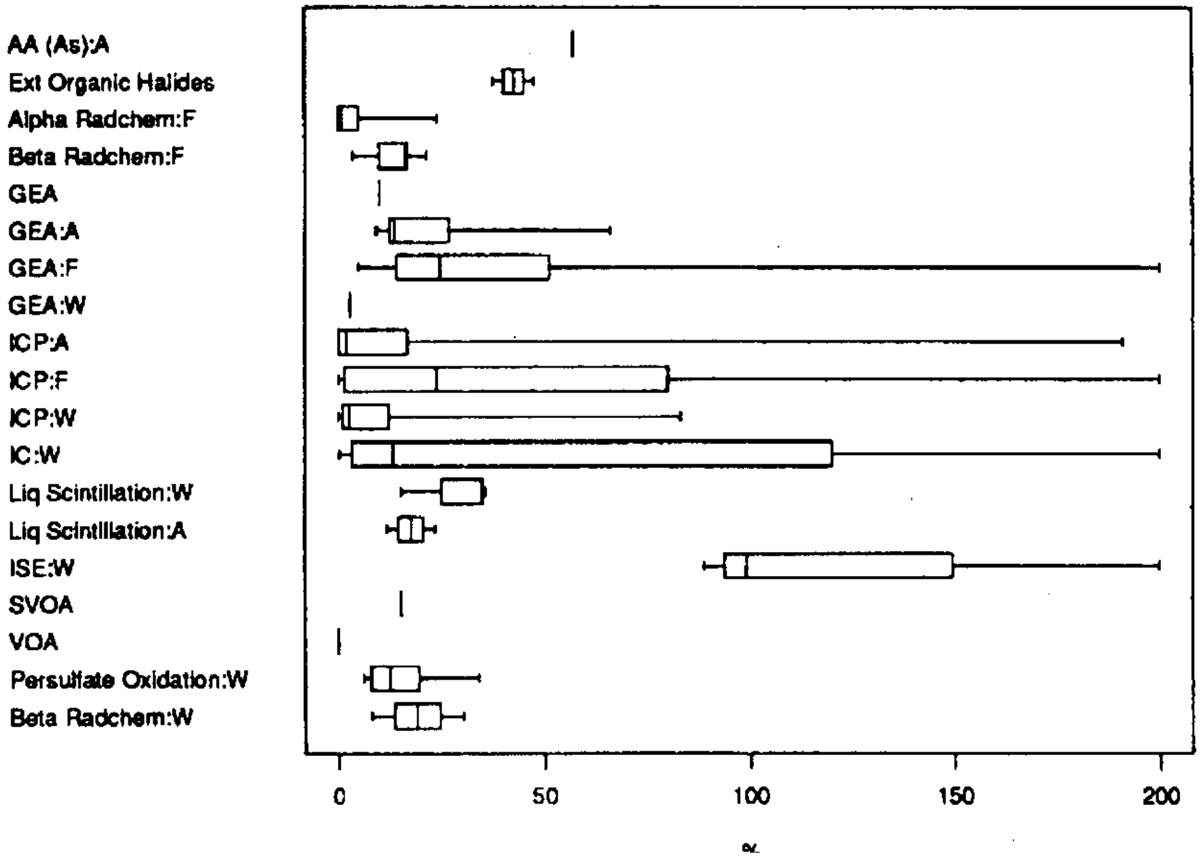
Approximately 1,400 blank measurements were made on tank 241-B-201 samples; the majority were for the ICP analyses. Most blanks (83 percent) were below the detection limit. Table B3-3 summarizes the blank measurements taken on tank 241-B-201. The last column in this table shows what percent of the actual measurement is represented by those blanks that were not below the detection limit. It is preferable that the blanks comprise a small percent of the actual measurement.

Table B3-3. Summary of Blank Measurements.

Analyte: Sample Preparation	# Blanks <DL	# Blanks >DL	Median Blank Observed (% of Actual Measurement)
GFAA (As):A	1	1	57
Extractable Organic Halides	1	2	43
Alpha Radchem:F	3	11	1
Beta Radchem:F	4	6	17
GEA	3	2	10
GEA:A	10	7	14
GEA:F	12	13	25
GEA:W	0	3	3
ICP:A	405	101	2
ICP:F	216	52	24
ICP:W	176	8	3
IC:W	15	6	13
Liquid Scintillation:W	0	3	35
Liquid Scintillation:A	6	2	18
ISE:W	0	3	99
SVOA	195	1	15
VOA	93	9	0
Persulfate Oxidation:W	2	7	12
Beta Radchem:W	0	2	19

Using boxplots, Figure B3-1 graphically illustrates the sizes of the blank measurements above the detection limit (13 percent of the total). The "box" for a given boxplot represents the range of the middle 50 percent of the blank recoveries. The vertical line in each box is the median blank value, and the lines coming out the ends of the boxes represent the entire range of the blank recoveries. Blank recoveries are measured as a percent of the actual analytical result.

Figure B3-1. Boxplots of Blank/Actual for Each Analytical Method
(<DL Measurements Excluded).



From Figure B3-1, it is apparent that some blank recoveries were quite large. As stated previously, the ICP fusion values were corrected for the blank contamination.

B3.3.3 Spike Measurements

Figure B3-2 (Heasler et al. 1994) shows the percent recovery distributions for spike measurements of each analysis type. Because not all spikes reported here (for example, alpha) were reported in the data package (Pool 1994), these results should be compared with the data validation results reported in Section B3.3.4.

The percent recovery is targeted between 75 and 125 percent, and this is generally the case for alpha and beta radiation chemistry and ion chromatography. However, as can be seen from the boxplots, several analytical methods show significantly more variability. No measurement was corrected for recovery problems.

Figure B3-2. Boxplots Percent Recovery Calculated from Spike Measurements.

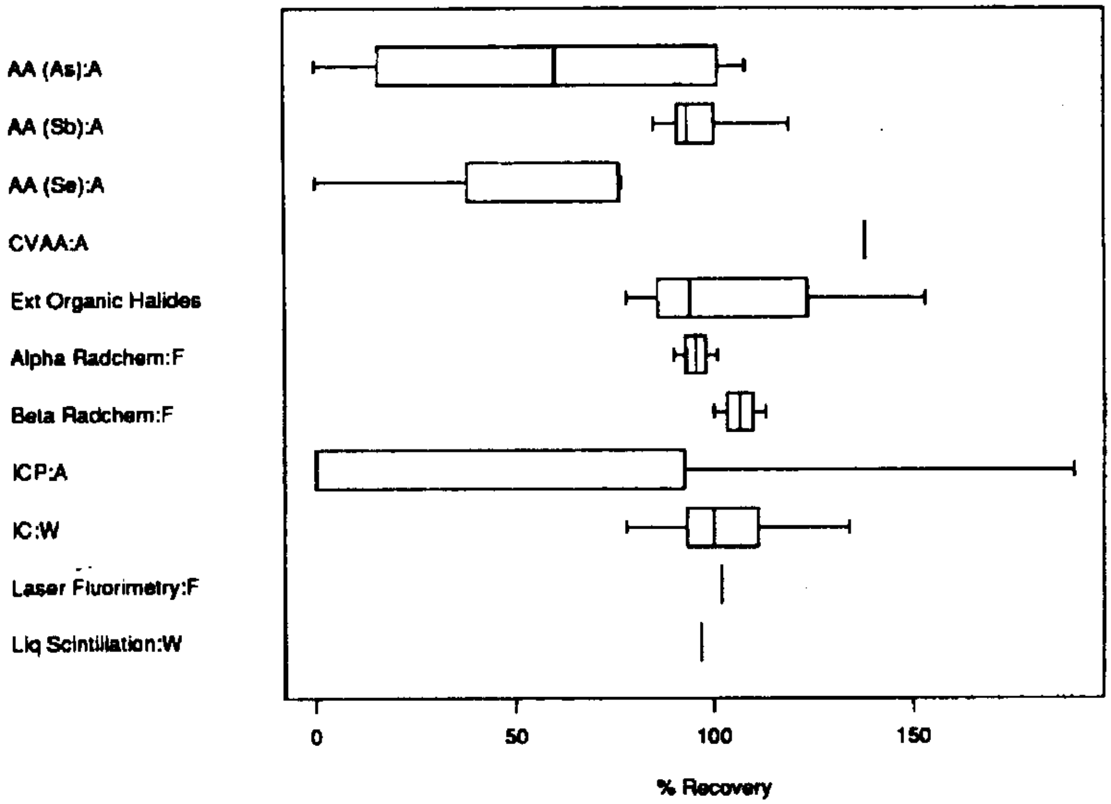


Table B3-4 (Heasler et al. 1994) summarizes the number of spike measurements outside the 75 to 125 percent recovery goals. The ICP acid stands out, with 152 measurements outside the desired range. Most recovery percents on ICP acid are quite small, approximately 4 percent. When using this table, consult Section B3.3.4 because not all spikes indicated here are reported in the data package (Pool 1994).

Table B3-4. Summary of Recoveries Calculated from Spike Measurements.

Analyte: Preparation Method	Outside Range[1]	Within Range[1]
GFAA (As):A	2	2
GFAA (Sb):A	0	4
GFAA (Se):A	1	2
CVAA:A	1	0
Extractable Organic Halides	1	2
Alpha Radchem:F[2]	0	4
Beta Radchem:F	0	2
ICP:A	152	78
IC:W	3	27
Laser Fluorimetry:F	0	1
Liquid Scintillation:W	0	1

Notes:

[1]Range = 75 to 125 %

[2]Alpha radiochemistry spikes could not be found in the data package (Pool 1994).

B3.3.4 Data Validation Summary

Validation of the tank 241-B-201 data package was performed by Hanford Analytical Services to the requirements provided in Sections 2.0, 2.2, and 2.4 of *Sample Management and Administration* (WHC-CM-5-3). The data validation was performed at level "C" as defined in Section 2.0 of WHC-CM-5-3. The overriding quality assurance document was Winters et al. (1990) (Pool 1994).

The primary objective of the data validation effort was to ensure the usability and defensibility of data produced for the single-shell tank characterization project. This was accomplished through a detailed examination of the data package to recreate the analytical process and verify that proper and acceptable analytical techniques had been applied. Additionally, the data package was checked for correct submission of required deliverables, correct data transcriptions from the raw data to the data summary forms, and proper calculation of a number of parameters.

Pool (1994) contains the results of the data validation including summary tables which show the data qualifiers and sub-qualifiers assigned to all analytical results. Validation of the chemical analyses data package was performed to the requirements provided in Section 2.0 of WHC-CM-5-3. The qualification categories for nonradiochemical analyses are as follows:

1 Chain of Custody
2 Holding Time
3 Instrument Calibration
4 Initial and Continuing Calibration Verification
5 Analytical Blanks
6 Preparation Blanks
7 Interference Check Sample
8 Laboratory Control Sample
9 Duplicate Analysis
10 Matrix Spike or Post-Digestion Spike
11 Retention Time
12 Contract Required Detection Limit Standard
13 Serial Dilution

Validation of the organic analysis data was performed to the requirements provided in Section 2.2 of WHC-CM-5-3. The qualifications categories for organic data validation are as follows:

1 Holding Times
2 Surrogate Recovery
3 Matrix Spike/Matrix Spike Duplicate
4 Blanks
5 GC/MS Tune (VOA, SVOA only)
6 Calibration
7 Internal Standards (VOA, SVOA only)
8 Pesticides Instrument Performance (Pest only)
9 Other Quality Control

Validation of the radiochemical parameters of the data package was performed to the requirements provided in Section 2.4 of WHC-CM-5-3. The unique qualification categories for radiochemical data validation are as follows:

1 Chain of Custody
2 Instrument Calibration
3 Efficiency Checks
4 Background Checks
5 Preparation Blanks
6 Laboratory Control Sample
7 Duplicate Analysis
8 Matrix Spike/Tracers/Surrogates

If a quality assurance criterion was not met for a particular category for a sample result, the data was qualified nondetected, estimated, or rejected (unusable). For the purposes of this tank characterization report, all data were used and no Hanford Analytical Services-flagged data were deleted. The following summary of the data validation findings was taken from Pool (1994).

B3.3.4.1 Chemical Data Validation Narrative

Inductively Coupled Plasma Spectroscopy

Laboratory control samples were not analyzed with the water leach and fused samples as required by WHC-CM-5-3 and Winters et al. (1990); therefore, results from the water and fusion digestions were assigned "rejected" qualifiers. No other serious problems were found with the ICP data. The calibration verification solutions which were run periodically throughout the analyses did not account for all analytes of interest; data associated with analytes not accounted for by at least one verification check standard were assigned an "estimated" qualifier.

Arsenic, Selenium and Antimony by Graphite Furnace Atomic Absorption

The metals were determined by GFAA on fusion digests of the core composite samples. Matrix interferences were indicated for selenium and arsenic. Matrix spike recoveries were 0 percent and 1 percent for selenium and arsenic, respectively. Therefore, all arsenic and selenium results were qualified unusable. Antimony results were qualified as estimated.

Mercury by Cold Vapor Atomic Absorption Spectrometry

Mercury was determined by CVAA. All mercury results were qualified as unusable because no matrix spike was performed. In addition, all results were qualified as estimated because of duplicate and laboratory control sample failures.

Volatile Organic Analyses

Volatile organics were determined using U.S. Environmental Protection Agency methodology. All volatile data was qualified unusable because hold times were grossly exceeded. In addition, the volatile analysis samples were received at ambient temperature. Data was also qualified as unusable because no explanation was provided for a cross out on calibration failure changing the result from "failed" to "passed."

Semi-Volatile Organic Analyses

Semivolatile organic analyses were performed on the core composite samples. All samples were qualified as unusable because the extractions were not performed within seven days of their respective collection dates. No other major problems were found.

Ion Chromatography

Anions and cyanide were determined by IC on the core composite samples. All hold times were grossly exceeded. No matrix spikes were performed for cyanide (CN). A matrix interference was indicated for fluoride, with no matrix spike to quantify the interference effects. All fluoride and CN results were qualified as unusable.

Ammonia

Ammonia was determined on water leachates of core composite samples. Analysis was by direct determination by ion selective electrode. The ammonia blank level exceeded that of the samples; therefore, ammonia results were qualified as unusable.

Hexavalent Chromium

Hexavalent chromium was determined spectrophotometrically on water leach samples from the core composite material. The maximum hold time was grossly exceeded for the hexavalent chromium analysis. All results were qualified as estimated.

Total Organic Carbon

Total organic carbon was determined using the hot persulfate method. Because the preparation procedure used did not correspond to the procedure number specified by Winters et al. (1990), and because of duplicate analysis failure, all results were qualified as estimated.

Total Inorganic Carbon

Hold times for the analysis of TIC were grossly exceeded. The blank results were greater than five times the detection limit. All TIC data were qualified as estimated.

Total Carbon

The hold times were grossly exceeded for total carbon determinations. Blank contamination exceeded five times the detection limit. All total carbon results were qualified as estimated.

Total Organic Halides/Extractable Organic Halides

The hold times for total organic halides and extractable organic halides were grossly exceeded. All data were qualified as unusable. In addition, the total organic halide summary data included in the original TCR (Heasler et al. 1994) could not be found in the data package (Pool 1994). Therefore, the data were not included in this report.

B3.3.4.2 Radiochemical Data Validation Summary. The most significant problem associated with the radiochemical analytical data was the lack of evidence of spikes, carriers, or tracers for most analytes. In such cases, "unusable" qualifiers were assigned.

Total Alpha

Total alpha activity was determined on the KOH fusion samples for all core composites. Total alpha analyses were also performed on the water leach sample from the core composite samples. Winters et al. (1990) required the laboratory to run a matrix spike of at least 1/2 to 2 times the sample isotope activity. Because there was no evidence of matrix spikes, all total alpha data was assigned an "unusable" qualifier. In addition, there was no evidence of initial instrument calibration being performed or laboratory control standards being run.

Total Beta

Total beta activity was determined on the KOH fusion and water leach core composite samples. All results were qualified as unusable because a laboratory control standard sample was not run with the analysis batch as required by Winters et al. (1990). In addition, there was no evidence of initial instrument calibration or preparation blank analysis.

Americium-241

Americium-241 was determined on the KOH fusion core composite samples by alpha proportional counting. Because there was no evidence that tracers were run with the samples, as required by Winters et al. (1990), all ^{241}Am data were assigned "unusable" qualifiers. In addition, the standards used for calibration and laboratory control samples were not National Institute of Standards and Technology traceable.

Neptunium-237

Neptunium-237 was determined on the KOH fusion core composite samples by alpha proportional counting. All data was flagged unusable because tracers were not run as required by Winters et al. (1990). In addition, evidence of traceability of the laboratory control standard and calibration standards was not provided.

Strontium-90

Strontium-90 was determined on the fused samples by separation followed by beta counting. Because no carrier recoveries are provided, all data were qualified as unusable.

Technetium-99

Technetium-99 was determined on the drainable liquid and fused solid core composite samples by beta proportional counting. Because no spikes or tracers were run with the samples, as required by Winters et al. (1990), all data was assigned an "unusable" qualifier.

Tritium

Tritium was determined on the water digests by liquid scintillation. All data was qualified as unusable because a matrix spike was not analyzed as required by Winters et al. (1990). In addition, there was significant blank contamination. No traceability documentation for the initial calibration standard was included in the data package.

Carbon-14

Carbon-14 was also determined on the water digests by liquid scintillation counting using internal standards. All calibration information, raw data, and standard and spike recoveries were included in the data package.

Selenium-79

Selenium-79 was determined on the water digests by liquid scintillation using calibrations obtained from ^{14}C reference material. Because ^{79}Se calibration standards do not exist, matrix spikes or laboratory control standards samples were not run. A selenium carrier was used in the analysis, and recoveries were acceptable.

Total Uranium

Uranium was determined by laser fluorescence on the fused core composite samples. An internal standard was run with each sample; therefore, no initial calibration was required. Standards used to prepare laboratory control standards and calibration standards were not traceable to the National Institute of Standards and Technology. No major problems were found.

Gamma Energy Analyses

Gamma energy analyses were run on the fused core composite samples, water leachates of the core composite samples, and two homogenization segments. No matrix spikes or tracers are required for GEA determinations. Some results were qualified as estimated because of duplicate analysis failures or high blank levels of ^{137}Cs and ^{60}Co. No significant deficiencies were found with the GEA determination.

Mass Spectrometry

Isotopic uranium and plutonium were determined by thermal ionization mass spectrometry on the fused solid core composite samples. Matrix spikes are not required because only ratios are measured. However, Winters et al. (1990) requires a standard to be run on a daily basis to verify instrument performance. All data was assigned an "estimated" qualifier because of missing calibration data.

Nickel 59/63

The fused core composite samples were analyzed for ^{59}Ni and ^{63}Ni by low energy photon spectroscopy. No major problems were found with the data.

B3.3.4.3 Physical and Rheological Data Validation Summary. No data validation problems were noted with any physical or rheological data. The physical analyses reviewed for data validation included weight percent solids, particle size, TGA, DSC, pH, and density. All rheological analyses were reviewed for data validation.

B3.4 DATA CONSISTENCY CHECKS

Comparisons of different analytical methods can help to assess data consistency and quality. Several correlations were possible with the data set provided by the two core samples, including a comparison of phosphorus as analyzed by ICP with phosphate as analyzed by IC and comparisons of the total alpha and total beta activities with the sums of their individual emitters. In addition, mass and charge balances were calculated to help assess overall data consistency.

B3.4.1 Comparison of Results from Different Analytical Methods

The following data consistency checks compare the results from two analytical methods. A close correlation between the two methods strengthens the credibility of both results, whereas a poor correlation brings the reliability of the data into question. The means used in these comparisons were from the preferred analytical method as listed in Table B1-3. Only the core composite sample means (see Table B3-8) were used.

The analytical phosphorus mean result as determined by ICP on fusion digested samples (the preferred method) was 5,450 μg/g, which converts to 16,700 μg/g of phosphate. This compared poorly with the IC phosphate mean result of 1,210 μg/g (ratio of 13.8) indicating that a large portion of the phosphate likely exists in an insoluble form. A better comparison would be between the phosphate results and the water digested phosphorus data. The water digested phosphorus mean was 413 μg/g, which converted to a phosphate value of 1,270 μg/g. The ratio between this value and the phosphate mean (1,210 μg/g) was 1.05 demonstrating data consistency.

Another internal data check is the comparison of the gross alpha and beta measurements with the respective activities of the individual emitters. The gross alpha result from the fusion digestion was 1.31 μCi/g. This value compared well with the sum of the individual alpha emitters (^{241}Am, $^{243/244}$Cm, ^{237}Np, ^{238}Pu, and $^{239/240}$Pu), 1.17 μCi/g. The ratio of these two results is 1.12. The gross beta result from the fusion digestion was 4.41 μCi/g. This result was compared to the analytical results for the primary beta emitters, ^{137}Cs and ^{90}Sr. Because ^{90}Sr is in equilibrium with its daughter product ^{90}Y, the ^{90}Sr activity must be multiplied by 2 to account for all beta emitters. The sum of the beta emitters was 4.98 μCi/g, comparing well with the gross beta result as evidenced by the ratio of 1.13 for the two numbers.

A final internal data check is the comparison of the ^{241}Am results by alpha proportional counting and GEA. The ^{241}Am means from these two methods were 0.0287 μCi/g from alpha proportional counting and 0.031 μCi/g from GEA. The numbers agreed quite well, with a ratio of 0.93.

B3.4.2 Mass and Charge Balances

The principle objective in performing mass and charge balances was to determine whether the measurements were consistent. In calculating the balances, only the analytes listed in Section B2.0, with a detected mean of 3,000 μg/g or greater, were considered. The result for each analyte, from the digestion and analytical method considered to produce the best concentration estimate (see Table B1-3), was used in the balances. Only the core composite sample means were used.

The cation data is listed in Table B3-5. Aluminum was assumed to exist as boehmite, because most samples did not display an endothermic reaction during the DSC analysis at 300 °C (570 °F), and very little aluminum was water soluble. Based on the water digest ICP data, it was determined that all silicon existed in an insoluble form. The water digest data also revealed that 25 percent of the chromium existed in a soluble form. This is supported by the Cr (VI) data as well. Therefore, 25 percent of the overall chromium mean was assumed to exist as soluble CrO_4^{2-}, with the remaining amount existing as insoluble $Cr(OH)_3$. All phosphorus was assumed to exist as phosphate. Based on the water digest data, the majority of the phosphorus was insoluble. The phosphorus portion in the soluble phosphate result (from IC) was calculated and subtracted from the overall phosphorus mean. The remaining phosphorus was assumed to exist as the compounds Na_3PO_4 and $BiPO_4$. The amount of insoluble sodium was derived by subtracting the ICP water digest mean from the fusion digest mean, yielding an insoluble sodium portion of 7,300 μg/g. The full insoluble sodium portion was assumed to exist as Na_3PO_4. Lanthanum was assumed to exist as LaF_3, probably a sound assumption because 224 waste is produced during the lanthanum fluoride process. All other cations, except potassium and sodium, were assumed to be in their most common hydroxide or oxide form, and the concentrations of the assumed species were calculated stoichiometrically. Because precipitates are neutral species, all positive charge

Table B3-5. Cation Mass and Charge Data.

Analyte	Concentration ($\mu g/g$)	Assumed Species	Concentration of Assumed Species ($\mu g/g$)	Charge ($\mu eq/g$)
Aluminum	3,440	$AlO(OH)$	7,640	0
Bismuth	94,500	$BiPO_4$	17,300	0
		Bi_2O_3	92,100	0
Calcium	12,200	CaO	17,100	0
Chromium	2,480[1]	$Cr(OH)_3$	4,910	0
Iron	13,400	$FeO(OH)$	21,300	0
Lanthanum	15,100	LaF_3	21,300	0
Manganese	19,200	$MnO(OH)$	30,700	0
Phosphorus	5,450	$BiPO_4$	---[2]	0
Potassium	5,810	K^+	5,810	149
Silicon	20,200	SiO_2	43,300	0
Sodium	38,200[3]	Na^+	30,900	1,340
		Na_3PO_4	17,400	0
Total			310,000	1,490

Notes:

[1]Chromium is included in the mass and charge balances because its overall mass was greater than 3,000 $\mu g/g$. From the water digest ICP data, it was determined that about 25 percent of the chromium was water soluble. Consequently, the water soluble portion is included in the anion table as CrO_4^{2-}. The insoluble portion appears in the cation table.

[2]A mean of 5,450 $\mu g/g$ of phosphorus was found in the tank. Of that amount, 395 $\mu g/g$ were in the form of soluble phosphate (derived from the IC phosphate mean of 1,210 $\mu g/g$). The remaining 5,055 $\mu g/g$ was assumed to exist as Na_3PO_4 and $BiPO_4$. No value was entered into column 4 for phosphorus because its mass has already been accounted for in the other compounds.

[3]The insoluble sodium portion was calculated by subtracting the water digest mean from the fusion digest mean. The insoluble portion was assumed to exist as Na_3PO_4.

was attributed to the potassium and sodium cations. The anions listed in Table B3-6 were assumed present as potassium and sodium salts and were expected to balance the positive charge exhibited by the cations. The concentrations of cationic species in Table B3-5, the anionic species in Table B3-6, and the percent water were used to calculate the mass balance.

Table B3-6. Anion Mass and Charge Data.

Analyte	Concentration (μg/g)	Assumed Species	Concentration of Assumed Species (μg/g)	Charge (μeq/g)
Chromium	859	CrO_4^{2-}	1,920	37.3
Fluoride	5,830	F^-	5,830	307
Nitrate	49,300	NO_3^-	49,300	795
Total			57,100	1,140

The mass balance was calculated from the formula below. The factor 0.0001 is the conversion factor from μg/g to weight percent.

$$\text{Mass balance} = \text{\% Water} + 0.0001 \times \{\text{Total Analyte Concentration}\}$$
$$= \text{\% Water} + 0.0001 \times \{AlO(OH) + BiPO_4 + Bi_2O_3 + CaO + Cr(OH)_3 + FeO(OH) + LaF_3 + MnO(OH) + K^+ + SiO_2 + Na^+ + Na_3PO_4 + CrO_4^{2-} + F^- + NO_3^-\}$$

The total analyte concentrations calculated from the above equation is 367,000 μg/g. The estimated tank weight percent water reported in Heasler et al. (1994) was 60.7 percent (or 607,000 μg/g), based solely on gravimetric determinations on the core 26 composite samples. Adding this value to the total analyte concentration would produce a mass balance of 97.4 percent (see Table B3-7). Gravimetric analyses were performed on the segments from core 26, and a TGA was performed on the segments from core 27. Combining these data sets yields a mean of 53.0 weight percent water. This value should be used with caution, because it Pool (1994) stated that the core 27 samples had lost a significant amount of moisture before being analyzed. The mass balance resulting from adding this percent water to the total analyte concentration is 89.7 percent.

The following equations demonstrate the derivation of total cations and total anions; the charge balance is the ratio of these two values.

<u>Total cations</u> (μeq/g) $= [K^+]/39.1 + [Na^+]/23.0 = 1{,}490\ \mu\text{eq/g}$

<u>Total anions</u> (μeq/g) $= [CrO_4^{2-}]/116 + [F^-]/19.0 + [NO_3^-]/62.0 = 1{,}140\ \mu\text{eq/g}$

Table B3-7. Mass Balance Totals.

Totals	Concentrations ($\mu g/g$)
Total from Table B3-5	310,000
Total from Table B3-6	57,100
Water %	607,000
Grand Total	974,000

The charge balance obtained by dividing the sum of the positive charge by the sum of the negative charge was 1.31.

The above calculations yielded a reasonable mass balance (close to 100 percent). However, the charge balance was not as close to 1.00 as desired. This may indicate the presence of an anion that was not analyzed. For example, hydroxide was not measured on the core samples, which may account for some of the discrepancy in the charge balance.

B3.5 MEANS AND CONFIDENCE INTERVALS

The statistics in this section were calculated using analytical data from the most recent core sampling event for tank 241-B-201. Analysis of variance (ANOVA) techniques were used to estimate the mean, and calculate confidence limits on the mean, for all analytes that had at least 25 percent of the values above the detection limit. If at least 25 percent of the reported values were above the detection limit all of the data were used in the computations. The detection limit was used as the value for a nondetected result. No ANOVA estimates were computed for analytes with less than 25 percent of results above the detection limit.

B3.5.1 Composite-Level Means

The results given below are ANOVA estimates based on data from cores 26 and 27 of tank 241-B-201. In the laboratory, two core composite samples were formed from the eight homogenized segment samples of each core. The estimates are given in Table B3-8.

Only core composite sample data were used in deriving the mean concentrations. No homogenization test data were used in the mean calculations. For the analytes evaluated by ICP, only the data from the potassium hydroxide fusion were used in determining the fusion means. The only exceptions to this were for potassium and nickel. Fusion means for these analytes were based on a sodium peroxide fusion in a zirconium crucible. The core 26 composite sample fusion values have been corrected for blank contamination.

There was almost 100 percent recovery from every segment within both core samples. Consequently, any bias in the results given in Table B3-8 caused by incomplete core recovery is minimal.

Table B3-8 gives the upper and lower limits to the 95 percent confidence intervals for analytes that had at least 25 percent of the values above the detection limit. Some analytes had a lower confidence limit less than zero. Because an actual inventory value of less than zero is not possible, the lower limit is reported as zero whenever this occurred.

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
ANIONS		μg/g	%	μg/g	μg/g		
Chloride	IC:W	1,650	7	182	3,120	0	8
Cyanide	IC:W	3.49	28	0.00	15.9	4	8
Fluoride	IC:W	5,830	2	4,350	7,310	0	8
Nitrate	IC:W	49,300	1	43,000	55,600	0	8
Nitrite	IC:W	881	13	0.00	2,340	0	8
Phosphate	IC:W	1,210	15	0.00	3,520	0	8
Phosphate	ICP:F	16,700	n/a	n/a	n/a	n/a	n/a
Sulfate	IC:W	348	44	0.00	2,290	4	8
CATIONS		μg/g	%	μg/g	μg/g	<DL	#
Aluminum	ICP:A	3,440	74	0.00	35,800	0	13
Aluminum	ICP:F	3,910	71	0.00	39,200	0	8
Aluminum	ICP:W	58.3	56	0.00	473	0	13
Ammonia	ISE:W	10.4	46	0.00	71.2	2	8
Antimony	AA (GF):A	38.8	n/a	n/a	n/a	7	8
Antimony	ICP:A	<37.1	n/a	n/a	n/a	13	13
Antimony	ICP:F	<240	n/a	n/a	n/a	8	8
Antimony	ICP:W	<8.04	n/a	n/a	n/a	13	13
Arsenic	AA (GF):A	0.450	12	0.00	1.14	4	8

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
CATIONS		μg/g	%	μg/g	μg/g		
Arsenic	ICP:A	59.5	n/a	n/a	n/a	12	13
Arsenic	ICP:F	411	15	0.00	1,190	4	8
Arsenic	ICP:W	< 12.9	n/a	n/a	n/a	13	13
Barium	ICP:A	86.4	38	0.00	504	0	13
Barium	ICP:F	167	59	0.00	1,420	0	8
Barium	ICP:W	<1.61	n/a	n/a	n/a	13	13
Beryllium	ICP:A	<3.71	n/a	n/a	n/a	13	13
Beryllium	ICP:F	<24.0	n/a	n/a	n/a	8	8
Beryllium	ICP:W	<0.804	n/a	n/a	n/a	13	13
Bismuth	ICP:A	1.01E+05	13	0.00	2.68E+05	0	13
Bismuth	ICP:F	94,500	3	58,500	1.31E+05	0	8
Bismuth	ICP:W	14.1	22	0.00	53.5	6	13
Boron	ICP:A	70.5	35	0.00	384	0	13
Boron	ICP:F	685	87	0.00	8,260	3	8
Boron	ICP:W	5.66	41	0.00	35.1	7	13
Cadmium	ICP:A	4.81	6	1.14	8.48	8	13
Cadmium	ICP:F	52.7	58	0.00	441	4	8
Cadmium	ICP:W	<0.804	n/a	n/a	n/a	13	13

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
CATIONS		μg/g	%	μg/g	μg/g		
Calcium	ICP:A	12,200	58	0.00	1.02E+05	0	13
Calcium	ICP:F	10,400	53	0.00	80,400	0	8
Calcium	ICP:W	50.6	66	0.00	475	0	13
Cerium	ICP:A	69.6	11	0.00	167	9	13
Cerium	ICP:F	<384	n/a	n/a	n/a	8	8
Cerium	ICP:W	<12.9	n/a	n/a	n/a	13	13
Chromium	ICP:A	3,340	4	1,640	5,040	0	13
Chromium	ICP:F	3,380	8	0.00	6,820	0	8
Chromium	ICP:W	859	3	532	1,190	0	13
Cobalt	ICP:A	9.60	4	4.72	14.5	8	13
Cobalt	ICP:F	53.8	8	0.00	108	5	8
Cobalt	ICP:W	<1.61	n/a	n/a	n/a	13	13
Copper	ICP:A	48.2	67	0.00	459	0	13
Copper	ICP:F	53.6	21	0.00	197	0	8
Copper	ICP:W	<0.804	n/a	n/a	n/a	13	13
Dysprosium	ICP:A	29.4	31	0.00	145	9	13
Dysprosium	ICP:F	<96.0	n/a	n/a	n/a	8	8
Dysprosium	ICP:W	<3.22	n/a	n/a	n/a	13	13

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
CATIONS		µg/g	%	µg/g	µg/g		
Europium	ICP:A	<7.43	n/a	n/a	n/a	13	13
Europium	ICP:F	<48.0	n/a	n/a	n/a	8	8
Europium	ICP:W	<1.61	n/a	n/a	n/a	13	13
Gadolinium	ICP:A	169	15	0.00	491	9	13
Gadolinium	ICP:F	<960	n/a	n/a	n/a	8	8
Gadolinium	ICP:W	<32.2	n/a	n/a	n/a	13	13
Hexavalent Chromium	Colorimetric:W	747	6	1.78	1,320	0	8
Iron	ICP:A	14,700	32	0.00	74,500	0	13
Iron	ICP:F	13,400	20	0.00	47,500	0	8
Iron	ICP:W	4.61	28	0.00	21.0	0	13
Lanthanum	ICP:A	15,100	10	0.00	34,300	0	13
Lanthanum	ICP:F	14,200	4	6,980	21,400	0	8
Lanthanum	ICP:W	19.9	60	0.00	172	3	13
Lead	ICP:A	1,360	9	0.00	2,920	0	13
Lead	ICP:F	1,240	26	0.00	5,340	0	8
Lead	ICP:W	<9.65	n/a	n/a	n/a	13	13
Lithium	ICP:A	<14.9	n/a	n/a	n/a	13	13
Lithium	ICP:F	<96.0	n/a	n/a	n/a	8	8

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
CATIONS		$\mu g/g$	%	$\mu g/g$	$\mu g/g$		
Lithium	ICP:W	<3.22	n/a	n/a	n/a	13	13
Magnesium	ICP:A	1,510	58	0.00	12,600	0	13
Magnesium	ICP:F	1,200	48	0.00	8,520	0	8
Magnesium	ICP:W	17.2	n/a	n/a	n/a	11	13
Manganese	ICP:A	19,200	29	0.00	89,900	0	13
Manganese	ICP:F	22,900	6	5,440	40,400	0	8
Manganese	ICP:W	3.15	31	0.00	15.6	0	13
Mercury	CVAA:A	0.599	46	0.00	4.10	0	8
Molybdenum	ICP:A	19.1	4	9.39	28.8	9	13
Molybdenum	ICP:F	<96.0	n/a	n/a	n/a	8	8
Molybdenum	ICP:W	<3.22	n/a	n/a	n/a	13	13
Neodymium	ICP:A	<22.3	n/a	n/a	n/a	13	13
Neodymium	ICP:F	<144	n/a	n/a	n/a	8	8
Neodymium	ICP:W	<4.83	n/a	n/a	n/a	13	13
Nickel	ICP:A	<479	3	296	662	0	13
Nickel	ICP:F	<429	21	0.00	1,570	0	4
Nickel	ICP:W	<4.03	24	0.00	16.3	9	13
Palladium	ICP:A	<111	n/a	n/a	n/a	13	13

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
CATIONS		μg/g	%	μg/g	μg/g		
Palladium	ICP:F	<720	n/a	n/a	n/a	8	8
Palladium	ICP:W	<24.1	n/a	n/a	n/a	13	13
Phosphorus	ICP:A	5,790	20	0.00	20,500	0	13
Phosphorus	ICP:F	5,450	14	0.00	15,100	0	8
Phosphorus	ICP:W	413	17	0.00	1,310	0	13
Potassium	ICP:A	5,810	13	0.00	15,400	0	13
Potassium	ICP:F	8,240	7	n/a	n/a	0	4
Potassium	ICP:W	4,650	8	0.00	9,380	0	13
Rhodium	ICP:A	<74.3	n/a	n/a	n/a	13	13
Rhodium	ICP:F	<480	n/a	n/a	n/a	8	8
Rhodium	ICP:W	<16.1	n/a	n/a	n/a	13	13
Ruthenium	ICP:A	<37.1	n/a	n/a	n/a	13	13
Ruthenium	ICP:F	<240	n/a	n/a	n/a	8	8
Ruthenium	ICP:W	<8.04	n/a	n/a	n/a	13	13
Selenium	AA (Se):A	<1.53	n/a	n/a	n/a	8	8
Selenium	ICP:A	66.8	9	0.00	143	9	13
Selenium	ICP:F	<360	n/a	n/a	n/a	8	8
Selenium	ICP:W	<12.1	n/a	n/a	n/a	13	13

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
CATIONS		μg/g	%	μg/g	μg/g		
Silicon	ICP:A	2,420	21	0.00	8,880	0	13
Silicon	ICP:F	20,200	63	0.00	1.82E+05	0	8
Silicon	ICP:W	629	29	0.00	2,950	0	13
Silver	ICP:A	12.3	20	0.00	43.6	5	13
Silver	ICP:F	47.2	7	5.22	89.2	6	8
Silver	ICP:W	<1.61	n/a	n/a	n/a	13	13
Sodium	ICP:A	37,900	9	0.00	81,200	0	13
Sodium	ICP:F	38,200	2	28,500	47,900	0	8
Sodium	ICP:W	30,900	3	19,100	42,700	0	13
Strontium	ICP:A	923	5	337	1,510	0	13
Strontium	ICP:F	897	6	213	1,580	0	8
Strontium	ICP:W	0.938	9	0.00	2.01	1	13
Tellurium	ICP:A	<74.3	n/a	n/a	n/a	13	13
Tellurium	ICP:F	<480	n/a	n/a	n/a	8	8
Tellurium	ICP:W	<16.1	n/a	n/a	n/a	13	13
Thallium	ICP:A	<371	n/a	n/a	n/a	13	13
Thallium	ICP:F	<2,400	n/a	n/a	n/a	8	8
Thallium	ICP:W	<80.4	n/a	n/a	n/a	13	13

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
CATIONS		μg/g	%	μg/g	μg/g		
Tin	ICP:A	596	n/a	n/a	n/a	11	13
Tin	ICP:F	<3,840	n/a	n/a	n/a	8	8
Tin	ICP:W	<129	n/a	n/a	n/a	13	13
Titanium	ICP:A	285	75	0.00	3,000	0	13
Titanium	ICP:F	425	68	0.00	4,100	0	8
Titanium	ICP:W	<0.804	n/a	n/a	n/a	13	13
Tungsten	ICP:A	59.6	n/a	n/a	n/a	12	13
Tungsten	ICP:F	<384	n/a	n/a	n/a	8	8
Tungsten	ICP:W	<12.9	n/a	n/a	n/a	13	13
Uranium	ICP:A	878	10	0.00	1,990	9	13
Uranium	ICP:F	<4,800	n/a	n/a	n/a	8	8
Uranium	ICP:W	<161	n/a	n/a	n/a	13	13
Uranium	Laser Fluorimetry:F	156	100	0.00	2,140	0	8
Vanadium	ICP:A	15.9	38	0.00	92.7	5	13
Vanadium	ICP:F	<48.0	n/a	n/a	n/a	8	8
Vanadium	ICP:W	<1.61	n/a	n/a	n/a	13	13
Yttrium	ICP:A	8.19	18	0.00	26.9	9	13
Yttrium	ICP:F	<48.0	n/a	n/a	n/a	8	8

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
CATIONS		μg/g	%	μg/g	μg/g		
Yttrium	ICP:W	<1.61	n/a	n/a	n/a	13	13
Zinc	ICP:A	217	6	51.6	382	0	13
Zinc	ICP:F	232	19	0.00	792	0	8
Zinc	ICP:W	<3.22	n/a	n/a	n/a	13	13
Zirconium	ICP:A	10.7	10	0.00	24.3	7	13
Zirconium	ICP:F	53.0	17	0.00	167	4	8
Zirconium	ICP:W	<1.61	n/a	n/a	n/a	13	13
ORGANICS		μg/g	%	μg/g	μg/g	<DL	#
Dodecane	SVOA	285	8	0.00	575	0	8
Pentadecane	SVOA	41.0	37	0.00	234	0	8
Tetradecane	SVOA	1,030	28	0.00	4,690	0	8
Total carbon	Persulfate Oxidation:D	5,590	50	0.00	41,100	0	8
Total carbon	Persulfate Oxidation:W	2,550	12	0.00	6,440	0	8
Total inorganic carbon	Persulfate Oxidation:D	3,140	32	0.00	15,900	0	8
Total inorganic carbon	Persulfate Oxidation:W	2,090	16	0.00	6,340	0	8
Total organic carbon	Persulfate Oxidation:D	2,360	73	0.00	24,200	0	8
Total organic carbon	Persulfate Oxidation:W	684	29	0	3200	0	8
Tridecane	SVOA	929	7	103	1,760	0	8

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
PHYSICAL PROPERTIES							
Weight percent solids	Percent Solids:D	39.3%	3%	24.3%	54.3%	0	8
RADIONUCLIDES		μCi/g	%	μCi/g	μCi/g	<DL	#
^{241}Am	Alpha Radchem:F	0.0287	4	0.0141	0.0433	0	8
^{241}Am	GEA:F	0.0310	4	0.0152	0.0468	0	8
^{14}C	Liq Scintillation:W	3.16E-04	n/a	n/a	n/a	7	8
^{134}Cs	GEA:F	0.00238	n/a	n/a	n/a	0	3
^{137}Cs	GEA:F	0.800	27	0.00	3.54	0	8
^{137}Cs	GEA:W	0.0469	n/a	n/a	n/a	0	4
^{60}Co	GEA:F	0.00196	75	0.00	0.0206	3	8
$^{243/240}$Cm	Alpha Radchem:F	0.00164	21	0.00	0.00602	0	4
^{154}Eu	GEA:F	0.00438	51	0.00	0.0328	2	8
^{155}Eu	GEA:F	0.00328	n/a	n/a	n/a	4	5
Gross alpha	Alpha Radchem:F	1.31	18	0.00	4.31	0	8
Gross alpha	Alpha Radchem:W	4.71E-04	21	0.00	0.00173	0	4
Gross beta	Beta Radchem:F	4.41	28	0.00	20.1	0	8
Gross beta	Beta Radchem:W	0.0534	16	0.00	0.162	0	4
^{237}Np	Alpha Radchem:F	<1.24E-04	n/a	n/a	n/a	8	8
^{59}Ni	Beta Radchem:A	6.86E-06	22	0.00	260E-05	6	8
^{63}Ni	Liquid Scintillation:A	1.88E-04	25	0.00	7.85E-04	0	8

Table B3-8. Tank Concentration From Composite Samples. (11 sheets)

Analyte	Method	Mean		95% Confidence Interval		Obs.	
		$\hat{\mu}$	%RSD ($\hat{\mu}$)	LL	UL	<DL	#
RADIONUCLIDES		**μCi/g**	**%**	**μCi/g**	**μCi/g**	**<DL**	**#**
^{238}Pu	Alpha Radchem:F	0.00690	98	0.00	0.0928	0	4
$^{239/240}$Pu	Alpha Radchem:F	1.13	30	0.00	5.44	0	4
^{40}K	GEA:W	0.00124	n/a	n/a	n/a	0	2
^{90}Sr	Beta Radchem:F	2.09	51	0.00	15.6	0	8
^{99}Tc	Beta Radchem:F	0.00194	n/a	n/a	n/a	8	8
Total alpha[1]	Alpha Radchem:F	1.14	n/a	n/a	n/a	0	4
Tritium	Liq Scintillation:W	0.0205	78	0.00	0.224	0	8
^{234}U	Mass Spectrometry:F	0.00540%	6	0.00128%	0.00952%	0	8
^{235}U	Mass Spectrometry:F	0.691%	0	n/a	n/a	0	8
^{236}U	Mass Spectrometry:F	0.00520%	6	0.00124%	0.00916%	0	8
^{238}U	Mass Spectrometry:F	99.3%	0	n/a	n/a	0	8
^{238}Pu	Mass Spectrometry:F	0.00487%	15	0.00%	0.0142%	0	8
^{239}Pu	Mass Spectrometry:F	98.4%	0	n/a	n/a	0	8
^{240}Pu	Mass Spectrometry:F	1.55%	1	1.35%	1.75%	0	8
^{241}Pu	Mass Spectrometry:F	0.0130%	16	0.00%	0.0394%	0	8
^{242}Pu	Mass Spectrometry:F	0.00384%	43	0.00%	0.0248%	0	8

Notes:

LL = lower limit UL = upper limit

$\hat{\mu}$ = estimated mean

[1]Total alpha emitted from ^{238}Pu, ^{239}Pu, ^{240}Pu, and ^{241}Pu.

As the analytical values from the tank 241-B-201 core samples were reviewed, some anomalous results were noted. Some were excluded from the reported statistical results; others were identified as "outliers" but were used in the analyses.

Table B3-9 shows the sample results that were excluded from the random effects model fits. The results were excluded because of their large disagreements with the other results for a particular constituent. The core 26 and core 27 laboratory reports (Pool 1994) were consulted to assign reasons for anomalous results.

Table B3-9. Composite Values Omitted from Analyses as Suspect.

Analyte	Method	Core	Composite	Aliquot	Value	Below DL	Units
Bismuth	ICP:W	26	1	1	49.61	yes	μg/g
Iron	ICP:W	26	1	1	16.8	no	μg/g
Nickel	ICP:W	26	1	1	14.883	yes	μg/g
Strontium	ICP:W	26	1	1	2,481	yes	μg/g
Arsenic	ICP:F	26	1	2	636.7	no	μg/g
Copper	ICP:F	26	1	2	358.5	no	μg/g
Iron	ICP:F	27	1	2	12,409	no	μg/g
Lead	ICP:F	27	1	2	1,959	no	μg/g
Chloride	IC:W	26	2	2	2,000	no	μg/g
Fluoride	IC:W	26	2	2	7,200	no	μg/g
Nitrate	IC:W	26	2	2	59,000	no	μg/g
Phosphate	IC:W	26	2	2	1,300	no	μg/g
^{60}Co	GEA:F	26	1	2	0.00859	no	μCi/g
Tritium	Liquid Scintillation	26	2	1	0.113	no	μCi/g
^{235}U	Mass Spectrometry	26	2	2	0.5825	no	%

In Table B3-9, the results for bismuth, iron, nickel, and strontium (ICP:W) are from the same aliquot. These four constituents are not expected to be water soluble, and all analytical results are close to the detection limits. Because of these conditions, the variability for these analytes is expected to be large. Therefore, these results were removed from the random effects model fits (Heasler et al. 1994).

The arsenic and copper results (ICP:F) are from the same aliquot. For both constituents, the results from this aliquot are much larger than other results from the same core (26), and these two results were removed from the model fits (Heasler et al. 1994).

The lead and iron results (ICP:F) are from the same aliquot. The RPDs for the primary and duplicate results on three of the composite samples were small for three pairs (for example, 1%). The RPD for the other composite sample (core 26, composite 1) was somewhat larger (19.1% for lead and 6.6% for iron). The primary result is closer to the range of results from the other three composite samples. For this reason, the duplicate results (core 26, composite 1) for iron and lead were dropped from the model fits (Heasler et al. 1994).

The results for chloride, fluoride, nitrate, and phosphate (IC:W) are also from the same aliquot (core 26, composite 2, aliquot 2). This aliquot result is unusually higher than the other three results from the same core, which agree with one another. The core 26 data report (Pool 1994) notes that the RPDs are high for the duplicate pairs from core 26. That report attributes the large RPD values to poor sample homogenization. For this reason, these results were removed from the random effects model fits (Heasler et al. 1994).

The ^{60}Co, tritium, and ^{235}U results were outside the range of other results for the given constituent. The core 26 data report (Pool 1994) indicates that the process blanks showed significant tritium contamination from previous tritium work. These three results were not used in the random effects model fits (Heasler et al. 1994).

B3.5.2 Segment-Level Means

There were two core samples obtained from tank 241-B-201 in July 1991. Each core consisted of eight segments. This section contains estimates of concentration computed from segment-level data. The mean concentration estimates and variance components based on the segment-level data are listed in Table B3-10. Not all segments were analyzed for each analyte. In most cases, only two segments in each core were analyzed. For information on the model used to produce the results, see Section B3.5.3.2.

Table B3-10. Tank Concentration From Segment Samples. (3 sheets)

Constituent	Mean Concentration			ANOVA RSDs				Obs.	
	$\hat{\mu}$	Unit	RSD	σ_C	σ_S	σ_{CS}	σ_E	<DL	#
Anions									
Phosphorus	4,710	μg/g	12	0	13	13	4	0	24
Cations									
Aluminum	1,270	μg/g	87	5	106	89	3	0	24
Barium	61.3	μg/g	9	6	0	15	6	0	24
Bismuth	91,500	μg/g	29	3	40	8	7	0	24
Boron	4,010	μg/g	91	0	32	177	6	0	24
Calcium	6,380	μg/g	75	0	103	35	4	0	24
Chromium	3,340	μg/g	30	15	35	23	4	0	24
Copper	24.9	μg/g	71	30	89	48	12	7	24
Iron	11,300	μg/g	32	6	45	0	5	0	24
Lanthanum	13,500	μg/g	25	0	34	12	4	0	24
Lead	269	μg/g	57	5	80	8	8	4	24
Magnesium	784	μg/g	65	0	85	46	3	0	24
Manganese	16,600	μg/g	33	33	26	0	68	0	24
Molybdenum	30.9	μg/g	26	34	8	0	36	20	24
Nickel	431	μg/g	27	19	33	0	5	0	24
Potassium	2,900	μg/g	15	6	20	0	16	3	24
Silicon	5,070	μg/g	69	20	46	118	7	0	24
Silver	15.2	μg/g	28	36	12	0	37	20	24
Sodium	34,000	μg/g	10	3	13	2	5	0	24
Strontium	902	μg/g	31	0	44	7	4	0	24
Titanium	114	μg/g	90	30	95	110	1	1	24
Uranium	1,470	μg/g	33	40	14	17	41	21	24
Zinc	46.6	μg/g	31	17	40	0	10	7	24
Zirconium	16.0	μg/g	23	13	16	35	31	20	24
Organic Compounds									
Hexamethyl-disiloxane	21.4	μg/g	26	n/a	35	n/a	35	0	5
Methoxytri-methylsilane	143	μg/g	22	n/a	35	n/a	24	0	6
Toluene	5.08	μg/g	23	n/a	38	n/a	13	0	6

Table B3-10. Tank Concentration From Segment Samples. (3 sheets)

Constituent	Mean Concentration			ANOVA RSDs				Obs.	
	$\hat{\mu}$	Unit	RSD	σ_C	σ_S	σ_{CS}	σ_E	<DL	#
Organic Compounds									
Trimethyl-silanol	132	μg/g	28	n/a	43	n/a	35	0	6
Physical Properties									
Centrifuged solids density	1.47	g/ml	7	n/a	9	n/a	6	0	9
Centrifuged supernate density	1.05	g/ml	3	n/a	0	n/a	8	0	9
Critical flow rate-2 in.	38.0	gal/min	39	n/a	54	n/a	20	0	6
Critical flow rate-3 in.	75.5	gal/min	38	n/a	53	n/a	21	0	6
Critical velocity-2 in.	3.66	ft/sec	38	n/a	52	n/a	20	0	6
Critical velocity-3 in.	3.27	ft/sec	38	n/a	52	n/a	21	0	6
Density	1.25	g/ml	2	0	0	0	11	0	26
Flow behavior index	0.862	n/a	4	n/a	0	n/a	11	0	6
Particle size number density mean	1.26	μm	5	n/a	0	n/a	14	0	8
Particle size volume density mean	29.2	μm	21	n/a	0	n/a	60	0	8
Reynolds number-2 in.	8,260	n/a	1	n/a	0	n/a	3	0	6
Reynolds number-3 in.	10,400	n/a	3	n/a	0	n/a	6	0	6
Settled solids	76.9	%	11	n/a	0	n/a	33	0	9
Shear strength	13,300	dynes/cm^2	5	n/a	6	n/a	5	0	3
Volume % centrifuged solids	54.2	%	20	n/a	0	n/a	61	0	9
Weight loss %	43.3	%	17	n/a	17	n/a	53	0	16
Weight % centrifuged solids	59.3	%	17	n/a	0	n/a	52	0	9
Weight % solids	46.4	%	18	20	0	22	36	0	32
Yield point	3.84	Pa	55	n/a	76	n/a	24	0	6

Table B3-10. Tank Concentration From Segment Samples. (3 sheets)

Constituent	Mean Concentration			ANOVA RSDs				Obs.	
	$\hat{\mu}$	Unit	RSD	σ_C	σ_S	σ_{CS}	σ_E	<DL	#
Radionuclides									
^{241}Am	0.0283	µCi/g	41	3	48	46	9	0	24
^{134}Cs	0.00162	µCi/g	13	0	7	0	44	7	15
^{137}Cs	0.145	µCi/g	57	17	78	0	42	0	24
^{60}Co	0.00190	µCi/g	29	26	23	22	34	6	18
^{154}Eu	0.00332	µCi/g	31	34	16	25	34	7	17
^{155}Eu	0.00415	µCi/g	23	26	15	0	25	8	12

B3.5.3 ANOVA Models

B3.5.3.1 ANOVA for Composite Samples. The statistical model that describes the structure of the core composite sample data is

$$Y_{ijk} = \mu + C_i + S_{ij} + E_{ijk}$$

where:

Y_{ijk} = The measured value of concentration of a constituent in replicate k of composite j of core i.

μ = The mean concentration of the constituent in the tank.

C_i = The deviation of concentration in core i from the mean value.

S_{ij} = The deviation of concentration in core replicates. (Two replicates were processed on each composite sample.)

E_{ijk} = The analytical (laboratory) error in the measurements.

The 95 percent confidence upper limit (UL) and lower limit (LL) on the mean were calculated as follows:

$$\hat{\mu} \pm t_{(a-1,0.025)} * \sqrt{\hat{\sigma}^2_{\hat{\mu}}}.$$

In the equation, $\hat{\mu}$ is the estimated mean, a is the number of core samples, $\hat{\sigma}^2_{\hat{\mu}}$ is the variance of the sample mean and $t_{(a-1,0.025)}$ is the quantile from Student's t distribution with a-1 degrees of freedom for a two sided 95 percent confidence interval.

For the core composite data from tank 241-B-201, a is two and $t_{(1,0.025)}$ is 12.706. The mean, μ, and variance, $\hat{\sigma}^2_{\hat{\mu}}$, were estimated using restricted maximum likelihood estimation methods (Harville 1977).

B3.5.3.2 ANOVA for Segment Level Samples. The model used to produce the results in Table B3-10 is:

$$Y_{ijk} = \mu + C_i + S_j + CS_{ij} + E_{ijk}$$

where i is the core, j is the segment, and k is the sample replicate of the measurement. The term μ represents the tank average, and the other terms represent deviations from the average. Each deviation in the above model has an associated variability that is measured by the ANOVA procedure. These sources of variability are denoted by σ_C, σ_S, etc., and are expressed as a percent RSD (the sigma divided by μ). The variability estimate terms are defined as:

σ^2_C = Horizontal variability estimate
σ^2_S = Vertical variability estimate
σ^2_{CS} = General spatial variability estimate
σ^2_E = Residual variability estimate

These variance estimates provide the best summaries of tank spatial homogeneity. For example, if σ_C is dominant, then large horizontal variations exist in the waste. If σ_S is dominant, then the waste has very definite layers. Finally, if σ_{CS} is dominant, then the waste is spatially inhomogeneous, but the inhomogeneities are not associated with the vertical or horizontal direction in the tank.

Table B3-11 summarizes the spatial variabilities found in the tank. Vertical variability is the largest, with general spatial variability σ_{CS} a close second. Horizontal variability is the smallest observed spatial variability, although from a qualitative standpoint it appears significant as well (for example, the visually discernable difference observed between cores 26 and 27).

Table B3-11. Summary of RSD Values.

Constituent Types	Mean RSD (%)			
	σ_C	σ_S	σ_{CS}	σ_E
Anions	0	13	13	4
Metals	14	44	33	14
Organics	---	38		27
Physical	10	17	11	28
Radionuclides	18	31	16	31

One can also classify individual constituents by variability. From this perspective, vertical variability is largest for 29 constituents, and horizontal for only 3. This further indicates that layering is the dominant type of spatial variability in tank 241-B-201.

B3.5.4 Inventory Estimates

The inventory estimates in Table B3-12 were calculated by multiplying the means in Table B3-8 by an estimate of the total mass of waste in the tank. For some analytes, more than one preparation method was used (e.g., direct and water digestion, or acid, water, and fusion digestion). The preferred method is shown in Table B3-12, and is consistent with the original tank characterization report (Heasler et al. 1994).

According to Hanlon (1996) the volume of waste in the tank as 110 kL (29 kgal). The samples that were recovered had an average estimated density of 1.25 g/mL. Using the estimated density and the estimated waste volume, an estimate of the total mass is 138,000 kg. The inventory values in Table B3-12 were calculated by multiplying the mean values in Table B3-8 by this number.

Table B3-12. Analytical-Based Inventory of Tank 241-B-201. (6 sheets)

Analyte	Method	Mean	LL (95%)	UL (95%)
ANIONS AND CATIONS		kg	kg	kg
Chloride	IC:W	227	25.1	429
Cyanide	IC:W	0.480	0.00	2.19
Fluoride	IC:W	802	598	1,010
Nitrate	IC:W	6,780	5,920	7,640
Nitrite	IC:W	121	0.00	321
Phosphate	ICP:F	2,300	2,300	2,300
Sulfate	IC:W	47.9	0.00	315
Aluminum	ICP:A	473	0.00	4,920
Ammonia	ISE:W	1.43	0.00	9.79
Antimony	ICP:A	<5.09	n/a	n/a
Arsenic	ICP:A	8.18	8.18	8.18
Barium	ICP:A	11.9	0.00	69.2
Beryllium	ICP:A	<5.09	n/a	n/a
Bismuth	ICP:F	13,000	8,040	17,900
Boron	ICP:A	9.69	0.00	52.8
Cadmium	ICP:A	0.661	0.157	1.17
Calcium	ICP:A	1,680	0.00	14,000
Cerium	ICP:A	9.57	0.00	22.9
Chromium	ICP:A	459	226	693
ANIONS AND CATIONS		kg	kg	kg
Cobalt	ICP:A	1.32	0.649	1.99
Copper	ICP:A	6.63	0.00	63.0
Dysprosium	ICP:A	4.04	0.00	20.0
Europium	ICP:A	<1.02	n/a	n/a
Gadolinium	ICP:A	23.2	0.00	67.5
Hexavalent Chromium	Colorimetric:W	103	24.4	181
Iron	ICP:F	1,840	0.00	6,520
Lanthanum	ICP:A	2,080	0.00	4,710
Lead	ICP:A	187	0.00	401
Lithium	ICP:A	<2.04	n/a	n/a

Table B3-12. Analytical-Based Inventory of Tank 241-B-201. (6 sheets)

Analyte	Method	Mean	LL (95%)	UL (95%)
ANIONS AND CATIONS		kg	kg	kg
Magnesium	ICP:A	208	0.00	1,740
Manganese	ICP:A	2,640	0.00	12,400
Mercury	CVAA:A	0.0824	0.00	0.564
Molybdenum	ICP:A	2.63	1.29	3.96
Neodymium	ICP:A	<3.06	n/a	n/a
Nickel	ICP:A	65.9	40.8	91.0
Palladium	ICP:A	<15.2	n/a	n/a
Phosphorus	ICP:F	749	0.00	2,080
Potassium	ICP:A	799	0.00	2,120
Rhodium	ICP:A	<10.2	n/a	n/a
Ruthenium	ICP:A	<5.09	n/a	n/a
Selenium	AA (GF):A	<15.2	n/a	n/a
Selenium	ICP:A	9.19	0.00	19.7
Silicon	ICP:F	2,780	0.00	25,000
Silver	ICP:A	1.69	0.00	5.99
Sodium	ICP:F	5,250	3,920	6,590
Strontium	ICP:A	127	46.3	208
Tellurium	ICP:A	<10.2	n/a	n/a
Thallium	ICP:A	<509	n/a	n/a
Tin	ICP:A	n/a	n/a	n/a
Titanium	ICP:A	39.2	0.00	413
Tungsten	ICP:A	8.20	8.20	8.20
Uranium	Laser Fluorimetry:F	21.5	0.00	294
Vanadium	ICP:A	2.19	0.00	12.7
Yttrium	ICP:A	1.13	0.00	3.70
Zinc	ICP:A	29.8	7.09	52.6
Zirconium	ICP:A	1.47	0.00	3.34

Table B3-12. Analytical-Based Inventory of Tank 241-B-201. (6 sheets)

Analyte	Method	Mean	LL (95%)	UL (95%)
ORGANIC COMPOUNDS		kg	kg	kg
Pentadecane	SVOA	5.64	0.00	32.1
Tetradecane	SVOA	142	0.00	645
Total carbon	Persulfate Oxidation:W	351	0.00	885
Total inorganic carbon	Persulfate Oxidation:W	287	0.00	872
Total organic carbon	Persulfate Oxidation:D	325	0.00	3,330
Total organic carbon	Total Organic Halides	86.4	0.00	185
Tridecane	SVOA	128	14.1	241
PHYSICAL PROPERTIES		%	%	%
Weight percent solids	Percent Solids:D	39.3	24.3	54.3
RADIONUCLIDES		Ci	Ci	Ci
^{241}Am	GEA:F	4.26	2.10	6.43
^{14}C	Liquid Scintillation:W	0.0435	0.0435	0.0435
^{134}Cs	GEA:F	0.327	0.327	0.327
^{137}Cs	GEA:F	110	0.00	487
^{60}Co	GEA:F	0.270	0.00	2.84
$^{243/244}Cm$	Alpha Radchem:F	0.226	0.00	0.827
^{154}Eu	GEA:F	0.602	0.00	4.50
^{155}Eu	GEA:F	0.451	0.451	0.451
Gross alpha	Alpha Radchem:F	180	0.00	592
Gross beta	Beta Radchem:F	606	0.00	2,760
^{237}Np	Alpha Radchem:F	n/a	n/a	n/a
^{59}Ni	Beta Radchem:A	9.43e-04	0.00	0.00358

Table B3-12. Analytical-Based Inventory of Tank 241-B-201. (6 sheets)

Analyte	Method	Mean	LL (95%)	UL (95%)
RADIONUCLIDES		Ci	Ci	Ci
^{63}Ni	Liquid Scintillation:A	0.0259	0.00	0.108
^{238}Pu	Alpha Radchem:F	0.949	0.00	12.8
$^{239/239}Pu$	Alpha Radchem:F	155	0.00	748
^{40}K	GEA:W	0.171	0.171	0.171
^{90}Sr	Beta Radchem:F	287	0.00	2,150
^{99}Tc	Beta Radchem:F	0.267	0.267	0.267
Tritium	Liquid Scintillation:W	2.82	0.00	30.8

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APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

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APPENDIX C

STATISTICAL ANALYSIS FOR ISSUE RESOLUTION

In Appendix C, the data investigations numerical manipulations statistical and other required for the applicable DQOs for tank 241-B-201 would normally be performed and documented. Because the 1991 sampling of tank 241-B-201 predated DQOs, no DQO was applicable to the sampling event. An effort has been made to apply the current safety screening DQO requirements (Dukelow et al. 1995) to the 1991 data set.

C1.0 STATISTICAL ANALYSIS: CONFIDENCE INTERVALS

The safety screening DQO (Dukelow et al. 1995) defines acceptable decision confidence limits in terms of one sided 95 percent confidence intervals on the mean for each subsample. This appendix describes the statistical manipulations used to generate the one sided confidence limits supporting the safety screening DQO. Confidence intervals were computed for each sample from tank 241-B-201 analytical data (Shaver 1993). To address the criticality issue, the total alpha and plutonium data were used. The sample descriptions and confidence intervals are provided in Table 2-1. Confidence intervals were not performed for the differential scanning calorimetry data because all results were zero. (No exotherms were detected in any sample.)

The upper limit of a one sided 95 percent confidence interval for the mean is as follows:

$$\hat{\mu} + t_{(n-1,0.05)} * \sqrt{\frac{\hat{\sigma}^2}{n}}.$$

where $\hat{\mu}$ is the arithmetic mean of the data, n is the number of observations, $\hat{\sigma}^2$ is the estimate of the variance of the data, and $t_{(n-1,\ 0.05)}$ is the quantile from Student's t distribution with n-1 degrees of freedom corresponding to a one-sided 95 percent confidence interval.

For tank 241-B-201 data (per sample number), n is two (sample and duplicate) and $t_{(1,0.95)}$ is 6.314.

The upper limit of the 95 percent confidence interval for each sample number based on the total alpha data is listed in Table 2-1. Each confidence interval can be used to make the following statement. If the upper limit is less than 41 μCi/g, the null hypothesis that the total alpha is greater than or equal to 41 μCi/g at the 0.05 level of significance would be rejected. The upper limit of 41 μCi/g was calculated from the 1 g/L plutonium limit assuming a density of 1.5 g/mL (see Section 2.0) and assuming that all the plutonium is ^{239}Pu.

C2.0 APPENDIX C REFERENCES

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APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR TANK 241-B-201

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APPENDIX D

EVALUATION TO ESTABLISH BEST-BASIS INVENTORY FOR TANK 241-B-201

D1.0 INVENTORY EVALUATION

The following evaluation provides an engineering assessment of tank 241-B-201 contents. For this evaluation, the following assumptions are made:

- Tank waste mass is calculated using the measured density and the tank volume listed in Hanlon (1996). Both analytical-based and model-based inventories are derived using this volume. As a result, inventory comparisons are made on the same volume basis.
- Only the 224 waste stream contributed to solids formation. It is assumed that tanks with the same waste type will have the same concentrations of individual analytes.
- Bulk component (chemical specie) information is sufficient for comparing analytical and computed data sets. This information can be obtained from technical flowsheets (see Table D1-1).
- No radiolysis of NO_3 to NO_2 and no additions of NO_2 to the waste for corrosion purposes are factored into this evaluation.
- All Bi and Mn precipitate.
- No Si from blowsand is factored into this evaluation.
- All NO_3, C_2O_4, K, and Na remain dissolved in the interstitial liquid.
- Only the 224 waste stream contributes to the interstitial liquid.
- Concentration of components in interstitial liquid is based on a void fraction of 0.834 as reported by Agnew et al. (1996).
- La, Cr, PO_4, SO_4, and F partition between the liquid and solid phases.

Technical flowsheet information (Schneider 1951, and Kupfer et al. 1996) for 224 streams is shown in Table D1-1. The comparative LANL-defined waste streams are also shown in this table. The complete LANL inventory is shown in Table A3-1 of Appendix A. The sampling inventory is shown in Table B3-12 of Appendix B.

Table D1-1. Technical Flowsheet and HDW Defined Waste Streams.

Analyte	Flowsheet 224[1] (M)	Flowsheet 224[2] (M)	HDW 224[3] (M)
Bi	0.00595	0.00565	0.0592
C_20_4	0.0459	0.0147	0.630
Cr	0.00362	0.00327	0.00351
F	0.272	0.295	1.99
K	0.223	0.218	0.223
La	0.00376	0.00353	0.232
Mn	0.00514	0.00601	0.00379
Na	1.62	1.60	4.43
NO_3	1.06	0.684	1.30
PO_4	0.0323	0.0321	0.0946
SO_4	0.00140	0.00364	0.00139
NH_4	nr	0.0067	nr

Notes:

[1]Schneider (1951)
[2]Appendix C of Kupfer et al. (1996)
[3]Agnew et al. (1996)

D1.1 BASIS FOR CALCULATIONS USED IN THIS ENGINEERING EVALUATION

Because analytical data from a recent sampling event exists for tank 241-B-201, a throughput or concentration factor was derived. For those analytes that partially precipitated, a partitioning factor was also calculated.

One method of evaluating this tank would be to use fuel reprocessing records, flowsheet values, and waste transfer records; however, not all of these records are available for tank 241-B-201. With the concentration factor and the HDW reported void fraction or porosity (0.834), the inventory of soluble and insoluble analytes listed in the 224 facility waste stream flowsheets can be calculated.

D1.2 THROUGHPUT OR CONCENTRATION FACTOR

The concentration factor (CF) is derived using a flowsheet component that is assumed to be 100 percent insoluble. In this case, bismuth was used. The CF was determined by dividing the bismuth inventory found in the sample analysis by the bismuth inventory in the original waste stream (from the flowsheet). It is assumed that bismuth is 100 percent precipitated and that for each waste discharge pass through the tank, all of the bismuth was retained in the tank. The bismuth-based CF factor for tank 241-B-201 is calculated as follows:

$$CF = 13{,}000\ kg_{Bi} \div (0.00595\ moles_{Bi}/L_{224} \times 29\ kgal_{224} \times 3785\ L/kgal \times 208.98\ g/mole_{Bi} \times kg/1000\ g)$$

$$CF = 95$$

This same factor is used to calculate inventories for all analytes that precipitate in the tank. If the factor is valid and the flowsheet and the analytical data are correct, then inventories predicted by this investigation should be close to those reported in the analytical data. Tanks of the same waste type should have the same CF.

D1.3 PARTITIONING FACTOR

Once CFs for fully precipitated components for a waste type are determined, the sample analysis can be used to establish the way in which other components such as SO_4 or PO_4 partition between solids and supernate. For example, if the CF for bismuth is determined to be 95 for 224 waste, and the CF for PO_4 is 6.8, it can be concluded that 7 percent of the PO_4 in the neutralized process waste partitions to the waste solids, that is, the partitioning factor is 0.07.

Using this method, the estimated partitioning factor for other components for 224 waste based on tank 241-B-201 are as follows when using a CF of 95 for fully precipitated components:

SO_4:	0.03	La:	0.38	Cr:	0.24
PO_4:	0.07	F:	0.004		

D1.4 SAMPLE CALCULATIONS USED IN THIS ENGINEERING EVALUATION

Note: Both Schneider (1951) and Place (Kupfer et al. 1996) flowsheets were used; calculations are shown only for the Schneider flowsheet. In most cases, these values are similar; when they are different, the different results are discussed.

Components assumed to precipitate (Bi, Mn)

Bi: $0.00595\ \text{moles}_{Bi}/L_{224} \times 29\ \text{kgal}_{224} \times 3785\ \text{L/kgal} \times 208.98\ \text{g/mole}_{Bi} \times 95\ \text{CF} \times \text{MT}/1\text{e}6\ \text{g} = 13\ \text{MT}$

Mn: 2.94 MT

Components assumed to remain dissolved in the interstitial liquid (NO_3, K, Na)

NO_3: $1.06\ \text{moles}_{NO3}/L_{224} \times 0.834_{porosity} \times 3785\ \text{L/kgal} \times 29\ \text{kgal}_{B\text{-}201\ waste} \times 62\ \text{g/mole}_{NO3} \times \text{MT}/1\text{e}6\text{g} = 6.02\ \text{MT}$

K: 0.80 MT

Na: 3.41

Estimated component inventories from this engineering evaluation are compared with sampling- and HDW-estimated based inventories for selected components in Table D1-2. Observations regarding these inventories are noted by component in the following text. The complete HDW inventory is in Table A3-2.

Bismuth. This evaluation assumed Bi to precipitate 100 percent. Bismuth was used to determine the CF for this waste tank and for tanks 241-B-202 through B-204. This was accomplished by determining what CF would be necessary to bring the waste stream concentration, times the total waste volume, into agreement with the sampling data. This biases the data to match the sampling results for this one analyte. However, this CF is used for the other analytes, and the results agree with the sampling data (for example, manganese) indicating the CF is near the true CF for this tank. The Agnew HDW estimate is about 10 times lower than the sample. This appears to be caused by the assumption in the HDW that bismuth is partially soluble.

Table D1-2. Comparison of Selected Component Inventory Estimates.

Component	This Evaluation (MT)	Sampling-based (MT)	HDW Estimated (MT)
Bi	13	13	1.34
K	0.796	0.799	0.943
La		2.08	3.49
NO_3	6.02	6.78	8.72
Mn	2.94	2.64	0.0225
SO_4		0.0479	0.019
Cr		0.459	0.0137
PO_4		2.30	0.971
F		0.802	4.10
Na	3.41	5.25	11.00
H_2O %		60.7	57.1

Note:
MT = metric tons

Nitrate. The HDW estimated inventory is larger than the sampling-based inventory and both inventories are larger than the inventory estimated in this evaluation. The results of the flowsheet evaluation differs from the sampling analytical results by about 12 percent, which is good agreement. The HDW estimate is about 30 percent higher than the analytical results, which is reasonable agreement. The HDW estimated inventory is derived from the LANL-defined 224 waste stream, in which the nitrate concentration is about 30 percent higher than the Schneider flowsheet (Schneider 1951).

Sulfate. The HDW estimated inventory is smaller than the sampling-based inventory. Place's waste stream estimate (Kupfer et al. 1996) is about three times higher for sulfate than is Schneider's (1951). If the Place value is used in the HDW model, the HDW would probably more closely agree with the sample analytical data. Because almost everything else agrees with the sampling based inventory, further evaluation should be made between the sulfate concentrations of Place and Schneider.

Chromium. The HDW-estimated inventory is considerably lower than the sampling-based inventory. The data suggests that about 24 percent of the Cr precipitated; the HDW model assumes a much smaller percent.

Phosphate. The sampling-based phosphate value is over two times greater than the HDW value and is seven times greater than the flowsheet value. These values cannot be reconciled at this time.

Fluoride. The analytical sample evaluation is based on water soluble fluoride only. The sample value is about five times lower than the HDW value. No method is currently available to measure water insoluble fluoride in tank waste. Until a sample is analyzed by a methodology that measures total fluoride, these differences cannot be reconciled.

Sodium. The sodium values calculated assumed Na does not partition and slightly under-predicts the sample analysis values. The HDW value is approximately three times the value from this evaluation. The difference between the flowsheet values used here and the HDW value is approximately a factor of three also. It appears that if the HDW and flowsheet values were reconciled, they would agree.

Potassium. The HDW and sampling values for potassium agree fairly well.

Lanthanum. Lanthanum appears to partition between the phases in the tank. The partitioning factor for La was 38 percent indicating that more La could have been released to the cribs than remains in these tanks. Based on past expectations, this is not expected.

Manganese. This is an insoluble analyte, and the value from this evaluation is in good agreement with the sample analytical data. However, the HDW model treats this as highly soluble at the waste stream concentration and predicts about 75 times less manganese in the waste.

Comments On Other Analytes

Strontium. The HDW model estimate for Sr is about 1,000 times higher than sampling results. The HDW model shows Sr in the 224 defined waste stream, apparently added for scavenging ^{90}Sr. This is incorrect; scavenging should be shown in the ferrocyanide defined wastes.

Aluminum. The sampling-based data show almost one half ton of Al in the tank. The engineering analysis could not address aluminum quantitatively because it does not appear in the process flowsheet.

Plutonium. Although the amount of Pu was low, it was much higher than predicted by the HDW model. The process flowsheet did not contain plutonium values, so Pu could not be evaluated in the engineering analysis.

D1.5 CONCLUSIONS

The calculations based on the flowsheet information and factors determined from the bismuth analytical data from tank 241-B-201 have been compared to analytical data and the HDW model. These calculations compare well with the analytical data and, in some cases, with the HDW model. It appears that the flowsheet concentrations, the throughput factor, and the solubility assumptions applied in the HDW model account for the major differences.

The calculated CFs and partitioning factors for tank 241-B-201 provide confidence that the analytical data for the tanks are representative of the tank contents and could be used as a basis for component inventories. This is substantiated by the following:

- CFs for components in tank 241-B-201 that are expected to fully precipitate are consistent indicating the sample probably represents the 224 flowsheet basis for the waste.

- The partitioning factors indicate reasonable partitioning of components based on experience and knowledge of the typical chemical behavior of the components in alkaline media.

D2.0 BEST-BASIS INVENTORY ESTIMATE

Information about chemical, radiological, and/or physical properties is used to perform safety analyses, engineering evaluations, and risk assessment associated with waste management activities and to address regulatory issues. These activities include overseeing tank farm operations and identifying, monitoring, and resolving safety issues associated with these operations and with the tank wastes. Disposal activities include designing equipment, processes, and facilities for retrieving wastes, and processing them into a form suitable for long-term storage. Chemical and radiological inventory information are generally derived using three approaches: (1) component inventories are estimated using the results of sample analyses, (2) component inventories are predicted using the HDW model based on process knowledge and historical information, or (3) a tank-specific process estimate is made based on process flowsheets, reactor fuel data, essential material usage, and other operating data. The information derived from these different approaches is often inconsistent.

An effort is underway to provide waste inventory estimates that will serve as the standard characterization for the various waste management inventories (Kupfer et al. 1996). As part of this effort, an evaluation of available chemical information for tank 241-B-201 was performed, including the following:

- Data from two 1991 core samples (this document).

- An inventory estimate generated by the HDW model (Agnew et al. 1996).

The calculations based on flowsheet information and factors determined from the bismuth analytical data from tank 241-B-201 have been compared to analytical data and the HDW model. These calculations compare well with the analytical data and, in some cases, with the HDW model. Given current resources, the best source of inventory data appears to be the analytical data which was obtained during the 1991 core sampling and analysis event. One analyte, for which the analytical data may not be the best source, is fluoride. Only the water soluble forms of fluoride are reported in the analytical data. Although the HDW model predicts more fluoride, water insoluble fluoride cannot be measured using current laboratory techniques. Both the analytical data and the HDW model values must be carefully considered for fluoride at the present time. Table D2-1 and D2-2 present the best-basis inventory estimates for the nonradioactive and radioactive waste components, respectively.

Table D2-1. Sampling-Based Best-Basis Inventory Estimates for Nonradioactive Components in Tank 241-B-201 (October 18, 1996).

Analyte	Total Inventory[1] (kg)	Basis (S, M, or E)[2]	Comment
Al	473	S	
Bi	13,000	S	
Ca	1,680	S	
Cl	227	S	
CO_3	not reported	S	
Cr	459	S	
F	802[3]	S	Water soluble only
Fe	1,840	S	
Hg	0.0824	S	
K	799	S	
La	2,080	S	
Mn	2,640	S	
Na	5,250	S	
Ni	65.9	S	
NO_2	121	S	
NO_3	6,780	S	
OH	not reported	S	
Pb	187	S	
P as PO_4	2,300	S	
Si	2,780	S	
S as SO_4	47.9	S	
Sr	127	S	
TOC	325	S	
U_{total}	21.5	S	
Zr	1.47	S	

Notes:

[1]See Table B3-12.

[2]S = Sample-based, M = Hanford Defined Waste model based, E = Engineering assessment based

[3]Fluoride is based on water soluble portion only.

Table D2-2. Sample-Based Best-Basis Inventory Estimates for Radioactive Components in Tank 241-B-201 (October 18, 1996).

Analyte	Total Inventory[1] (Ci)	Basis (S, M, or E)[2]	Comment
^{14}C	0.0435	S	
^{90}Sr	287	S	
^{99}Tc	0.267	S	
^{137}Cs	110	S	
^{154}Eu	0.602	S	
$^{239/240}Pu$	155	S	
^{241}Am	4.26	S	

Notes:

[1]See Table B3-12.

[2]S = Sample-based, M = Hanford Defined Waste model based, E = Engineering assessment based

D3.0 APPENDIX D REFERENCES

Agnew, S. F., J. Boyer, R. Corbin, T. Duran, J. FitzPatrick, K. Jurgensen, T. Ortiz, and B. Young, 1996, *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3*, Draft, March 5, 1996, Los Alamos National Laboratory, Los Alamos, New Mexico.

Anderson, J. D., 1990, *A History of the 200 Area Farms*, WHC-MR-0132, Westinghouse Hanford Company, Richland, Washington.

Brevick, C. H., L. A. Gaddis, and W. W. Pickett, 1995, *Historical Tank Content Estimate for the Northeast Quadrant of the Hanford 200 East Area*, WHC-SD-WM-ER-349, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

Hanlon, B. M., 1996, *Waste Tank Summary Report for Month Ending June 30, 1996*, WHC-EP-0182-99, Westinghouse Hanford Company, Richland, Washington.

Heasler, P. G., K. M. Remund, J. M. Tingey, D. B. Baird, and F. M. Ryan, 1994, *Tank Characterization Report for Single-Shell Tank B-201*, PNL-10100, Pacific Northwest Laboratory, Richland, Washington.

Kupfer, M. J., A. L. Boldt, B. A. Higley, S. L. Lambert, R. M. Orme, D. E. Place, L. W. Shelton, R. A. Watrous, G. L. Borsheim, N. G. Colton, M. D. LeClair, W. W. Schulz, D. C. Hedengren, and R. T. Winward, 1996, *Standard Inventories of Chemicals and Radionuclides in Hanford Site Tank Wastes*, WHC-SD-WM-TI-740, Rev. D (Draft), Westinghouse Hanford Company, Richland, Washington.

Schneider, K. L., 1951, *Flow Sheets and Flow Diagrams of Precipitation Separations Process*, HW-23043, Hanford Atomic Products Operation, Richland, Washington.

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APPENDIX E

BIBLIOGRAPHY FOR TANK 241-B-201

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APPENDIX E

BIBLIOGRAPHY FOR TANK 241-B-201

Appendix E provides a bibliography that supports the characterization of tank 241-B-201. This bibliography represents an in-depth literature search of all known information sources that provide sampling, analysis, surveillance, and modeling information, as well as processing occurrences associated with tank 241-B-201 and its respective waste types.

The bibliographical references are separated into three categories, each with subgroups. The categories and subgroups are listed below.

I. NON-ANALYTICAL DATA

- Ia. Models/Waste Type Inventories/Campaign Information
- Ib. Fill History/Waste Transfer Records
- Ic. Surveillance/Tank Configuration
- Id. Sample Planning/Tank Prioritization
- Ie. Data Quality Objectives/Customers of Characterization Data

II. ANALYTICAL DATA

- IIa. Sampling of Tank Waste and Waste Types
- IIb. Sampling and Analysis of 224 Waste/Other Tanks

III. COMBINED ANALYTICAL/NON-ANALYTICAL DATA

- IIIa. Inventories from both Campaign and Analytical Information
- IIIb. Compendium of Existing Physical and Chemical Documented Data Sources

The bibliography has an annotation at the end of each reference describing the information source. A majority of the information listed below may be found in the Lockheed Martin Hanford Corporation Tank Characterization Resource Center.

I. NON-ANALYTICAL DATA

Ia. Models/Waste Type Inventories/Campaign Information

Anderson, J. D., 1990, *A History of the 200 Area Tank Farms*, WHC-MR-0132, Westinghouse Hanford Company, Richland, Washington.

- Contains single-shell tank fill history and primary campaign/waste type information up to 1981.

Jungfleisch, F. M., and B. C. Simpson, 1993, *Preliminary Estimation of the Waste Inventories in Hanford Tanks Through 1980*, WHC-SD-WM-TI-057 Rev. 0-A, Westinghouse Hanford Company, Richland, Washington.

- A model based on process knowledge and radioactive decay estimations for different compositions of process waste streams assembled for total, solution, and solids compositions per tank. Also gives assumptions about waste/waste types and solubility parameters/constraints.

Schneider, K. J., 1951, *Flowsheets and Flow Diagrams of Precipitation Separations Process*, HW-23043, Hanford Atomic Products Operation, Richland, Washington.

- Contains compositions of process stream waste before transfer to 200 Area waste tanks.

Ib. Fill History/Waste Transfer Records

Agnew, S. F., R. A. Corbin, T. B. Duran, K. A. Jurgensen, T. P. Ortiz, and B. L. Young, 1996, *Waste Status and Transaction Record Summary for the Northeast Quadrant*, WHC-SD-WM-TI-615, Rev. 1, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains spreadsheets showing all available data on tank additions/transfers for the northeast quadrant.

Anderson, J. D., 1990, *A History of the 200 Area Tank Farms*, WHC-MR-0132, Westinghouse Hanford Company, Richland, Washington.

- Contains single-shell tank fill history and primary campaign/waste type information up to 1981.

Ic. Surveillance/Tank Configuration

Alstad, A. T., 1993, *Riser Configuration Document for Single-Shell Waste Tanks*, WHC-SD-RE-TI-053, Rev. 9, Westinghouse Hanford Company, Richland, Washington.

- Shows tank riser locations in relation to tank aerial view and a description of risers and riser contents.

Lipnicki, J., 1996, *Waste Tank Risers Available for Sampling*, WHC-SD-WM-TI-710, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

- Assesses riser locations for each tank; not all tanks are included/completed. Includes an estimate of risers that are available for sampling.

Leach, C. E. and S. M. Stahl, 1996, *Hanford Site Tank Farm Facilities Interim Safety Basis*, WHC-SD-WM-ISB-001, Rev. 0B, Westinghouse Hanford Company, Richland, Washington.

- Provides a ready reference to the tank farms safety envelope.

Prince, J. K., 1982, *Tank B-201 Liquid Level Reaching Decrease Criterion*, REP-031482, Rockwell Hanford Operations, Richland, Washington.

- Because of a slow decrease in liquid level measurements, the measurement met baseline decrease criterion in March 1982.

Teel, J. A., 1974, *Suspected Deformed Liner in Tank 241-B-201,* Occurrence Report 74-103, Atlantic Richfield Hanford Company Operations, Richland, Washington.

- Free liquid pumped from the tank because of suspected leakage. A visual observation during salt well installation revealed an obstruction below riser conjectured to be liner bulge.

Tran, T. T., 1993, *Thermocouple Status Single-Shell & Double-Shell Waste Tanks*, WHC-SD-WM-TI-553, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Compilation of information on thermocouples and status for Hanford Site waste tanks.

Id. Sample Planning/Tank Prioritization

Brown, T. M., 1996, *Tank Waste Characterization Basis*, WHC-SD-WM-TA-164, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Summarizes the technical basis for characterizing tank waste and assigns a priority number to each tank.

Winters, W. I., L. Jensen, L. M. Sasaki, R. L. Weiss, J. F. Keller, A. J. Schmidt, and M. G. Woodruff, 1990, *Waste Characterization Plan for Hanford Site Single-Shell Tanks*, WHC-EP-0210, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Characterization planning document. Includes test plan for sampling and analysis of tank 241-B-201.

WHC-CM-5-3, *Sample Management and Administration*, Westinghouse Hanford Company, Richland, Washington.

- Provides guidelines for performing data validation of samples in accordance with the RCRA requirements.

Ie. Data Quality Objectives/Customers of Characterization Data

Dukelow, G. T., J. W. Hunt, H. Babad, and J. E. Meacham, 1995, *Tank Safety Screening Data Quality Objective*, WHC-SD-W-SP-004, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Describes the sampling and/or data necessary to address the energetics, flammability, and criticality potential of each tank.

Osborne, J. W., and L. L. Buckley, 1995, *Data Quality Objectives for Tank Hazardous Vapor Safety Screening*, WHC-SD-WM-DQO-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

- Describes the vapor sampling and analyses required to address hazardous vapor issues for each tank.

II. ANALYTICAL DATA

IIa. Sampling of Tank Waste and Waste Types

Heasler, P. G., K. M. Remund, J. M. Tingey, D. B. Baird, F. M. Ryan, and J. M. Conner, 1996, *Tank Characterization Report for Single-Shell Tank B-201*, PNL-10100, Pacific Northwest National Laboratory, Richland, Washington.

- Summarizes information on the historical uses, present status, and the sampling and analysis results of waste stored in tank 241-B-203. (Later released as *Tank Characterization Report for Single-Shell Tank B-201*, WHC-SD-WM-ER-550, Rev. 0, Westinghouse Hanford Company, Richland, Washington).

Horton, J. E., 1978, *Characterization of 200 Series Tanks*, (internal memorandum 60120-78-131 to J. E. Mirabella, December 4), Rockwell Hanford Operations, Richland, Washington.

- Reports analytical data of sludge samples from B Tank Farm 200 series tanks.

Pool, K. N., 1994, *PNL 325 Laboratories Single-Shell Tank Waste Characterization, Tank B-201 Cores 26 and 27*, WHC-SD-WM-DP-037, Rev. 0A, Westinghouse Hanford Company, Richland, Washington.

- Contains sampling information and analytical results from the 1991 sampling event of cores 26 and 27.

IIb. Sampling and Analysis of 224 Waste/Other Tanks

Jo, J., L. C. Amato, and T. T. Tran, 1996, *Tank Characterization Report for Single-Shell Tank 241-B-203*, WHC-SD-WM-ER-587, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Summarizes the information on the historical uses, present status, and the sampling and analysis results of waste stored in this tank.

Sasaki, L. M., J. G. Douglas, R. H. Stephens, L. C. Amato, and T. T. Tran, 1996, *Tank Characterization Report for Single-Shell Tank 241-B-204*, WHC-SD-WM-ER-581, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Summarizes the information on the historical uses, present status, and the sampling and analysis results of waste stored in this tank.

III. COMBINED ANALYTICAL/NON-ANALYTICAL DATA

IIIa. Inventories from Campaign and Analytical Information

Agnew, S. F., R. Corbin, T. Duran, K. Jurgensen, T. Ortiz, and B. Young, 1995, *WSTRS Rev. 2: Supernatant Mixing Model (SMM) Tank Layer Model (TLM)*, LA-UR-94-4269, Rev. 2, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Provides modeling results of primary wastes types for each tank.

Agnew, S. F., J. Boyer, R. Corbin, T. Duran, J. FitzPatrick, K. Jurgensen, T. Ortiz, B. Young, 1996, *Hanford Tank Chemical and Radionuclide Inventories: HDW Model Rev. 3*, LA-UR-96-858, Rev. 0, Los Alamos National Laboratory, Los Alamos, New Mexico.

- Contains waste type summaries, primary chemical compound/analyte and radionuclide estimates for sludge, supernatant, and solids, as well as the Supernatant Mixing Model, Tank Layering Model, and individual tank inventory estimates.

Allen, G. K., 1976, *Estimated Inventory of Chemicals Added to Underground Waste Tanks, 1944 - 1975*, ARH-CD-601B, Atlantic Richfield Hanford Company, Richland, Washington.

- Contains information about major components for waste types and some assumptions. Purchasing records are used to estimate chemical inventories.

Allen, G. K., 1975, *Hanford Liquid Waste Inventory as of Sept. 30, 1974*, ARH-CD-229, Atlantic Richfield Hanford Company Operations, Richland, Washington.

- Contains information about major components for waste types and some assumptions.

Brevick, C. H., L. A. Gaddis, and W. W. Pickett, 1996, *Historical Tank Content Estimate for the Northeast Quadrant of the Hanford 200 East Areas*, WHC-SD-WM-ER-349, Rev 1A, Westinghouse Hanford Company, Richland, Washington.

Brevick, C. H., R. L. Newell, and J. W. Funk, 1996, *Supporting Document for the Historical Tank Content Estimate for B-Tank Farm*, WHC-SD-WM-ER-310, Rev. 1A, Westinghouse Hanford Company, Richland, Washington.

- Contains tank farm description, tank historical summary, level history and surveillance graphs, in-tank photographs, and waste inventory information.

Hanlon, B. M., 1996, *Tank Farm Surveillance and Waste Status Summary Report for Month Ending July 31, 1996*, WHC-EP-0182-100, Westinghouse Hanford Company, Richland, Washington.

- Most recent release of a series of summaries including fill volumes, Watch List tanks, occurrences, integrity information, equipment readings, equipment status, tank location, and other miscellaneous tank information. The series includes monthly summaries from December 1947 to the present; however, Hanlon has only compiled the monthly summaries from November 1989 to the present.
- Contains summary information from the supporting documents for Tank Farms A, AX, B, BX, BY, and C, in-tank photographic monages, and solid (including the interstitial liquid) composite inventory estimates.

Kupfer, M. J., A. L. Boldt, B. A. Higley, S. L. Lambert, R. M. Orme, D. E. Place, L. W. Shelton, R. A. Watrous, G. L. Borsheim, N. G. Colton, M. D. LeClair, W. W. Schulz, D. C. Hedengren, and R. T. Winward, *Standard Inventories of Chemicals and Radionuclides in Hanford Site Tank Wastes*, WHC-SD-WM-TI-740, Rev. D (Draft), Westinghouse Hanford Company, Richland, Washington.

- Contains "best-basis" inventory estimates for several tanks. Appendix C contains information and data from the bismuth phosphate process. This document is being generated in a parallel effort with the tank characterization reports (see Appendix D).

Schmittroth, F. A., 1995, *Inventories for Low-Level Tank Waste*, WHC-SD-WM-RPT-164, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains a global inventory based on process knowledge and radioactive decay estimations. Pu and U waste contributions are taken at 1% of the amount used in processes. Also compares information on ^{99}Tc from ORIGEN2 and analytical data.

IIIb. Compendium of Existing Physical and Chemical Documented Data

Brevick, C. H., L. A. Gaddis, and E. D. Johnson, 1995, *Tank Waste Source Term Inventory Validation, Vol I & II.*, WHC-SD-WM-ER-400, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains a quick reference to sampling information in spreadsheet or graphical form for 23 chemicals and 11 radionuclides for all tanks.

DeLorenzo, D. S., J. H. Rutherford, D. J. Smith, D. B. Hiller, K. W. Johnson, and B. C. Simpson, 1994, *Tank Characterization Reference Guide*, WHC-SD-WM-TI-648, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Summarizes issues surrounding the characterization of nuclear wastes stored in Hanford Site waste tanks.

Husa, E. I., R. E. Raymond, R. K., Welty, S. M. Griffith, B. M. Hanlon, R. R. Rios, and N. J. Vermeulen, 1993, *Hanford Site Waste Storage Tank Information Notebook*, WHC-EP-0625, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Contains in-tank photographs and summaries on tank descriptions, leak detection systems, and tank status.

Husa, E. I., 1995, *Hanford Waste Tank Preliminary Dryness Evaluation*, WHC-SD-WM-TI-703, Rev. 0., Westinghouse Hanford Company, Richland, Washington.

- Assesses relative dryness between tanks.

Van Vleet, R. J., 1993, *Radionuclide and Chemical Inventories for the Single Shell Tanks*, WHC-SD-WM-TI-565, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

- Contains selected sample analysis tables before 1993 for single-shell tanks.

Welty, R. K., 1988, *Waste Storage Tank Status and Leak Detection Criteria, Volumes I and II,* WHC-SD-TI-356, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

- Describes the nature, scope, and frequency of surveillance employed for waste storage tanks, states action criteria for response to data deviations, and presents tank data reviews between June 15, 1973, and June 15, 1988.

WHC, 1987, *Quarterly Trend Analysis of Surveillance Data*, (internal memorandum 65950-87-587 to R. J. Baumhardt, June 29), Westinghouse Hanford Company, Richland, Washington.

- Contains third quarter trend analysis of waste tank surveillance data to identify trends or anomalies.

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Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
OFFSITE					
Sandia National Laboratory P.O. Box 5800 MS-0744, Dept. 6404 Albuquerque, NM 87815					
D. Powers		X			
Nuclear Consulting Services Inc. P. O. Box 29151 Columbus, OH 43229-01051					
J. L. Kovach		X			
Chemical Reaction Sub-TAP P.O. Box 271 Lindsborg, KS 67456					
B. C. Hudson		X			
Tank Characterization Panel Senior Technical Consultant Contech 7309 Indian School Road Albuquerque, NM 87110					
J. Arvisu		X			
SAIC 20300 Century Boulevard, Suite 200-B Germantown, MD 20874					
H. Sutter		X			
555 Quince Orchard Rd., Suite 500 Gaithersburg, MD 20878					
P. Szerszen		X			

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Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
<u>Los Alamos Laboratory</u> CST-14 MS-J586 P. O. Box 1663 Los Alamos, NM 87545					
S. F. Agnew		X			
<u>Los Alamos Technical Associates</u>					
T. T. Tran	B1-44	X			
<u>Ogden Environmental</u> 101 East Wellsian Way Richland, WA 99352					
R. J. Anema		X			
<u>CH2M Hill</u> P. O. Box 91500 Bellevue, WA 98009-2050					
M. McAfee		X			
<u>Tank Advisory Panel</u> 102 Windham Road Oak Ridge, TN 37830					
D. O. Campbell		X			
<u>ONSITE</u>					
<u>Department of Energy - Richland Operations</u>					
J. F. Thompson	S7-54	X			
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B. C. Simpson	R2-12	X			
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Tank Characterization Resource Center	R2-12	5			
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